

Photo by Joe Jenkins

## THIS ISSUE'S PROJECT SPOTLIGHT:

CATHEDRAL OF SAINT ANDREW RE-SLATING  
PROJECT, LITTLE ROCK, ARKANSAS

Midland Engineering, South Bend, IN • Page 9

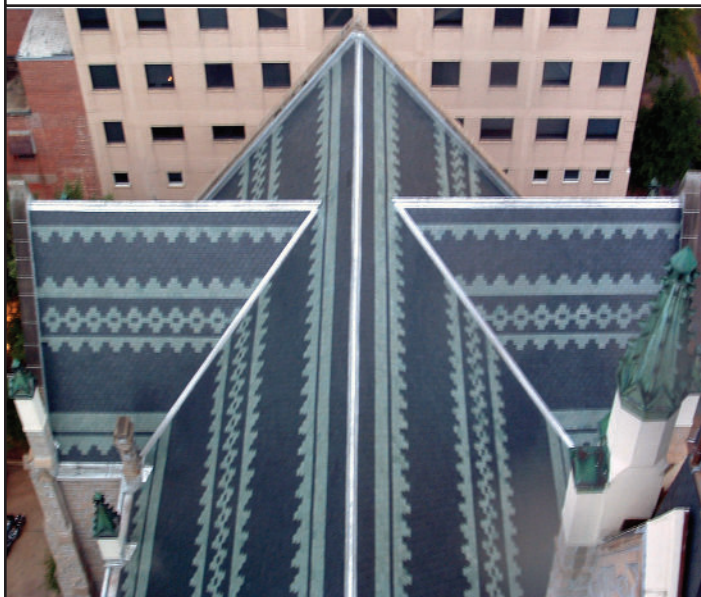


Photo by Joe Jenkins

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## SLATING CONICAL ROOFS

Page 1

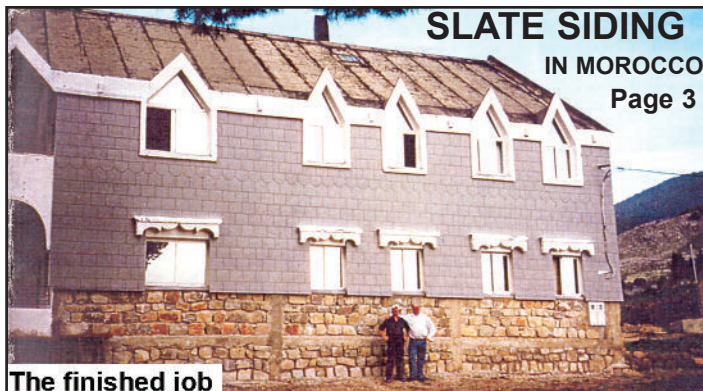


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## SLATE SIDING

IN MOROCCO

Page 3



The finished job

Photo Credit Unknown

## SLATING HIPS AND RIDGES

Page 10



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# Conical Slate Roofs

by Joseph Jenkins

*And How to Install Them*

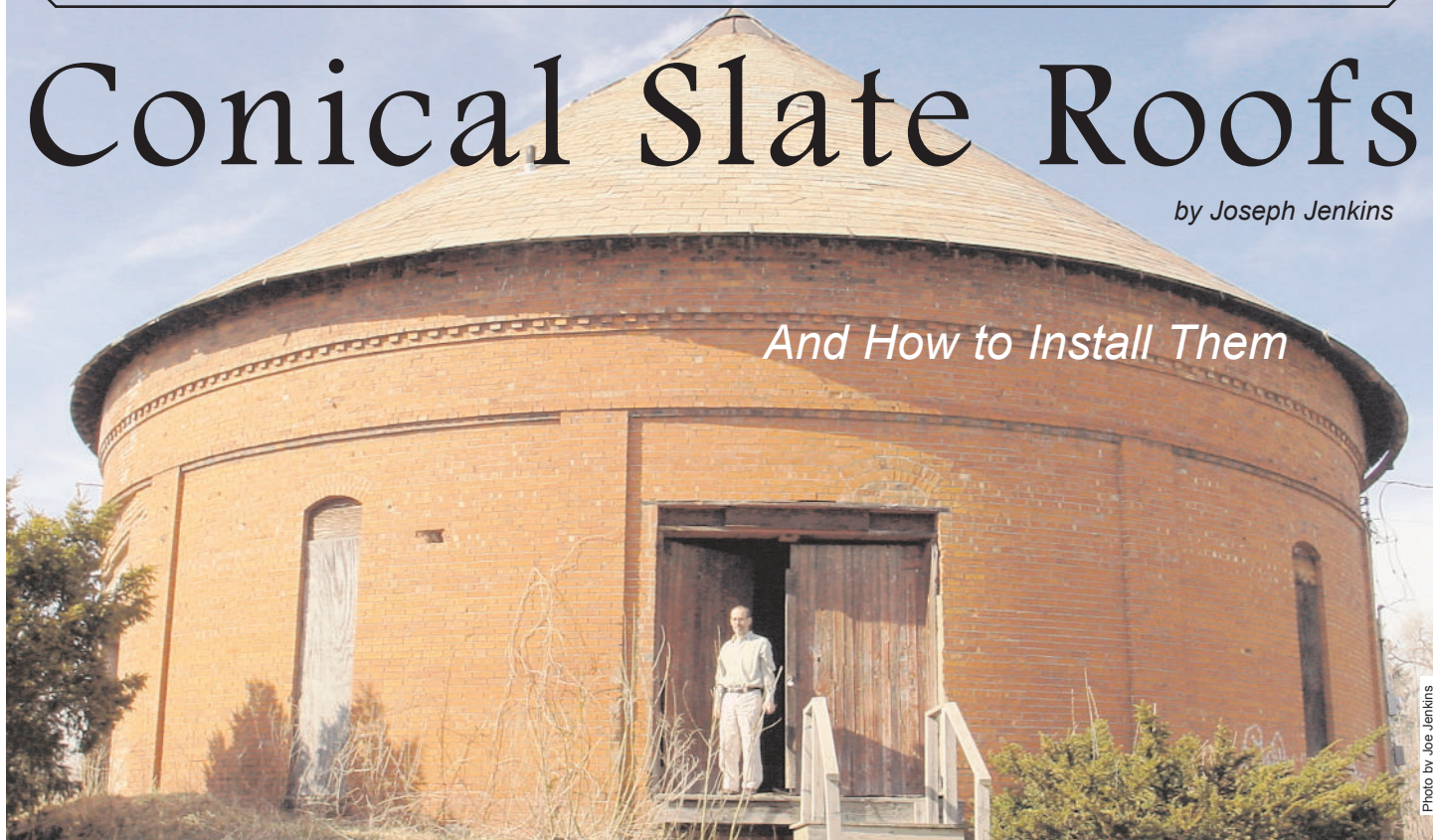


Photo by Joe Jenkins

**H**ow do you install flat, rectangular stones on a curved surface? Slate roofs on rounded turrets and domes are incredibly beautiful. But is it hard to install these types of roofs? How is it done?

The building shown in the top photo, built in 1889, is known as the Oberlin (Ohio) Gasholder. Remnants of the date, inscribed into the Vermont sea green slate roof with Vermont purple slates, still adorn the roof, but the roof is in dire need of repair. How many roofing contractors are up to the task of repairing or replacing the slate on a round turret?

The new slate roof in the left photo is located in Stirling, central Scotland, and installed by Dave O'Hare. The turret slates are Cupa heavy Spanish slates with English Burlington blue-grey random slates on the main roof. Note the "shouldered" slates (i.e. top corners cut off) and the diminishing widths as the slate climbs the turret. Rounded slate roofs require more time and more attention to detail, but they pay off in beauty and durability.

(CONTINUED ON PAGE 5)



Photo by Dave O'Hare

Scotland



Photo by Joe Jenkins

Pennsylvania, USA

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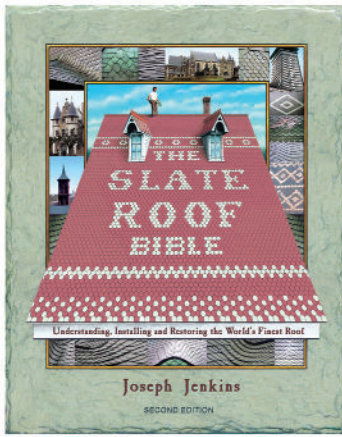
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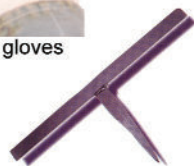
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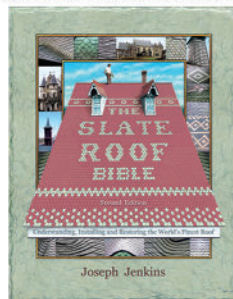


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# INSTALLING SLATE SIDING ON AN ORPHANAGE IN MOROCCO

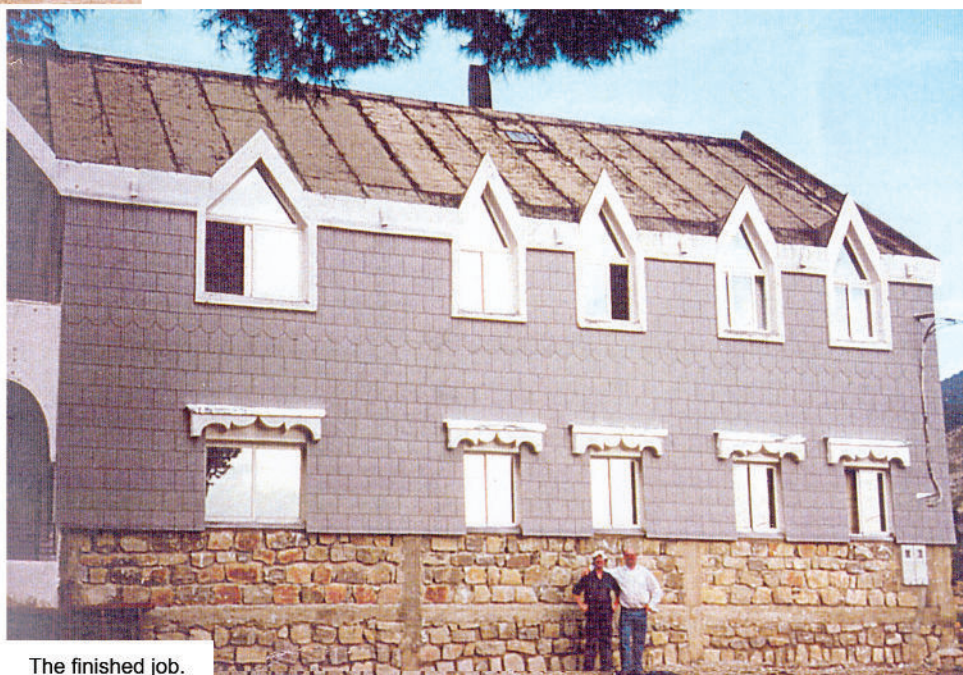
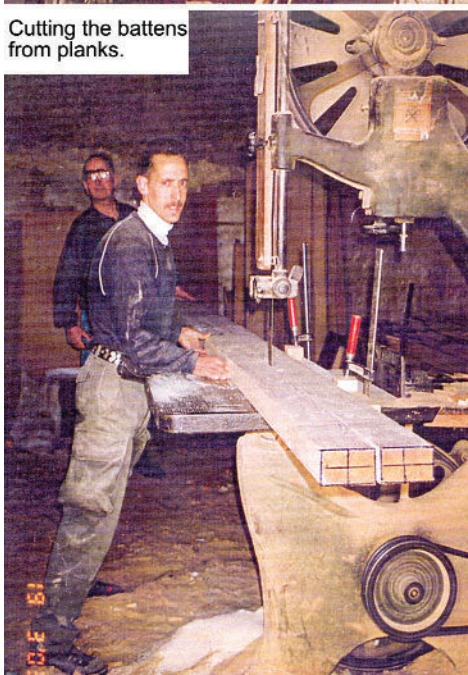


Removing the temporary polythene from the orphanage.



Partly slated. Downspouts removed.

Cutting the battens from planks.



The finished job.

John Ball, internationally renowned, award-winning roofer from Northern Ireland, and son, Gary, apparently do their fair share of charity work. They took a trip to the Village of Hope Christian Orphanage in the Middle Atlas Mountains of Morocco, carrying along 1,250 slates to be used as new siding on an orphanage building. They were thoughtful enough to send us some photos of their work, which we are using here with their kind permission. The orphanage is located about 200 miles "northeast, then southeast" of Casablanca by train and taxi. The unforeseen difficulties that popped up during the project included a lack of battens to nail the slates onto. This problem was solved by locating ten pieces of spruce planking at a town 12 miles away and cutting it into "tolerable battens" using a "very antiquated and dangerous looking bandsaw." John tells us that this area of Morocco is well off the tourist track and little English is spoken. The deeply Islamic people "showed no animosity toward us and were always ready for a great deal of handshaking, cheek kissing and 'Salam Aleecom' (you are welcome) greeting." Perhaps if our armies invaded countries bearing roofing slates rather than bombs, the world would be a safer, drier and happier place. ☐



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## TIPS AND BEEFS

**Tip:** Here's a great tip — send in your best slate roofing tip to us at *Traditional Roofing* and win a prize! The best tip we receive before the next TR issue goes to print will **win a Gilbert and Becker traditional slater's hammer worth a hundred bucks!** Send your tip to Traditional Roofing, PO Box 607, Grove City, PA 16127 or email it to us at editor@traditionalroofing.com.

**Beef:** Complain, complain, complain. Sometimes that's what we have to do. Take for example the information posted at roofingpeople.com about slate roofs: *"Disadvantages of slate roof systems: slate can be very heavy; very expensive; the colors are limited; requires frequent maintenance; hard to walk on; relies on underlayment which usually fails before the slate."* Almost all of this is simple repetition of standard misconceptions about slate roofing. Of course slate can be heavy — it's stone. The thicker it is, the heavier it is. But at standard thickness, virtually any roof can be covered with slate. Slate roofs are expensive? That depends on how you look at it. They may be more expensive than cheap roofs to install initially, but they last so long that the cost is spread out over a century or two, making them arguably the least expensive roof money can buy. The colors are limited? What are you buying, shoes or a roof? Requires frequent maintenance? Contractors work on old slate roofs that no one has touched in thirty years. Then, with a little maintenance, the roofs are good for additional decades. In that thirty-year time, most other roofs have been completely replaced — maybe twice. Hard to walk on? They should be. The best slate roofs are too steep to walk on. Slate roofs are not floors, are not meant to be walked on and should not be walked on. Relies on underlayment? Fact is, slate roofs require *no* underlayment. Ceramic tile roofs rely on underlayment — slate roofs do not. You can read more about underlayment and about Bigfoot walking on slate roofs in the article *Top 10 Slate Roof Installation Mistakes* in this TR issue. ■

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# SLATE ROOFING CONTRACTORS ASSOCIATION

OF NORTH AMERICA

The Slate Roofing Contractors Association (SRCA), an organization by and for slate roofing contractors, is now up and running as of March 1, 2005! North American slate roofing contractors have never before had an organization of their own despite over a century and a half of slate roofing in the U.S. The SRCA will provide an opportunity for slaters to pool their talents for the purposes of documenting traditional slate roof installation standards, developing training programs, enhancing professionalism and gaining respect for the trade.



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**UNINCORPORATED ASSOCIATION:** The SRCA is registered in the state of Pennsylvania as an unincorporated association, currently shepherded by Joseph Jenkins, Inc. and funded by membership dues. SRCA members will meet at an annual conference to exchange information, techniques, skills, gripes, ideas, and visions for the future. The SRCA could eventually develop into, or create, a non-profit trade association for slate roofing contractors. The SRCA expects to develop a North American Slate Roofers Guild with members drawn from its top tier of membership.

**CONTRACTOR PROFILE:** All contractors who are SRCA members are listed on the Contractor Directories mentioned above with a personal Contractor Profile. This Profile allows the public access to detailed information about the contractor that will help determine whether the contractor is the right one for a slate roofing project.

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## SLATING CONICAL ROOFS

(CONTINUED FROM PAGE 5)

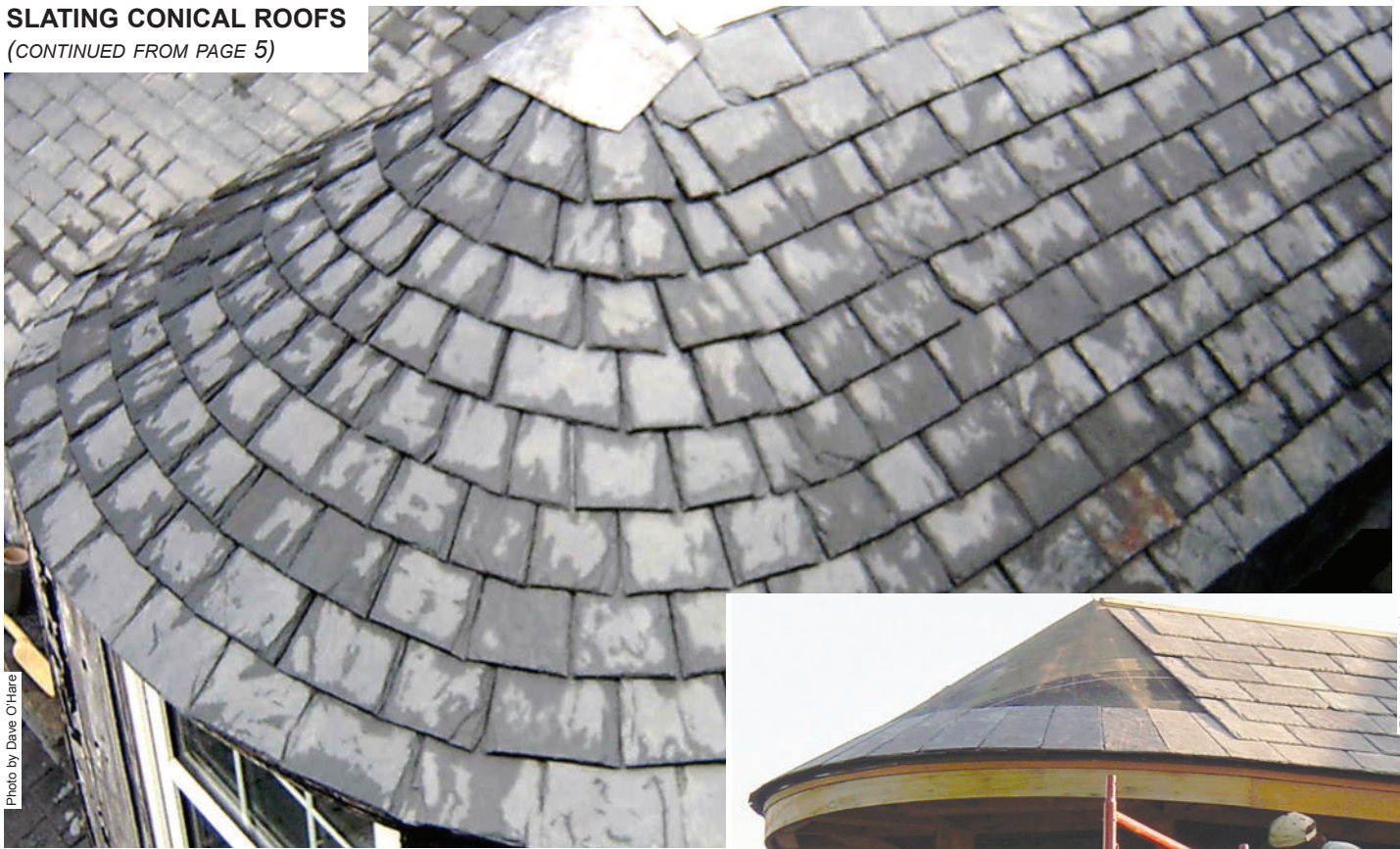


Photo by Dave O'Hare

The middle photo at right shows the small turret in Pennsylvania as the slate is starting to be applied. The wooden cant strip has been attached to the roof sheathing in 10" lengths. The bottom photo at right shows how a chalk box and line are being used as a trimming guide in order to cut the proper angle on the sides of the slates. The string is moved around the turret as the slates are installed. Every slate must be trimmed in this manner. A GT Professional hand-operated slate cutter was used for this purpose. Nail holes were punched as needed using a slate hammer. The holes were punched in the slate prior to trimming the edges. All hole punching and cutting was done from the back of the slate. The top and middle photos on p. 5 show the work in progress and the bottom photo on page 5 shows the finished turret prior to the installation of the ridge.

The fact that every slate must be trimmed at an angle on a small turret such as this indicates that more time and fiddling around are necessary to get the job done right. Contractors must allow for this when bidding a job of this nature. In the end, however, such a slated turret can last well over a century, impressing people with its beauty and character, as the Oberlin Gasholder Building has proven. [Author's note: The Gasholder slate roof was installed in 1889 without any felt underlayment.]



Photo by Joe Jenkins

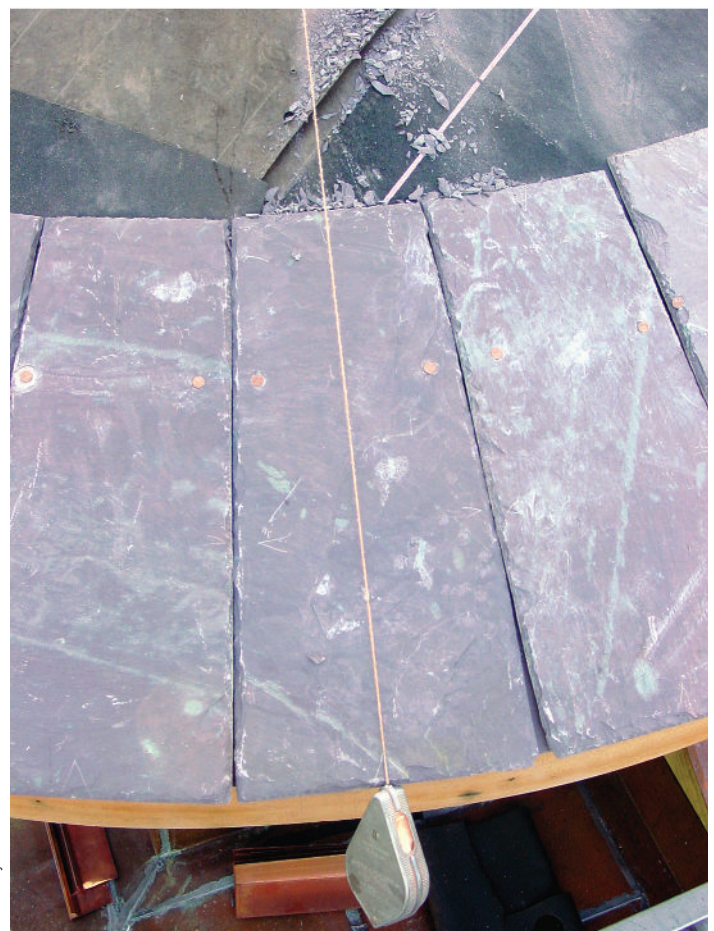


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# SLATING CONICAL ROOFS

(CONTINUED FROM PAGE 1)

The lower turret (page 1) is on a new Vermont mottled green and purple roof in western Pennsylvania installed by the author. More on this later.

Mr. O'Hare has been involved in about 12 round turrets in the 20 years he's been in the trade. He explains, "Once the turret is felted and assuming the turret rises to a point, insert a large six-inch nail or similar at the very top of the point, then hook a string line onto the nail."

O'Hare has a unique method for aligning the slates as they curve around the roof. First, he lays the slates onto a straight board on the ground or scaffolding. A strip of wood can be nailed onto the bottom edge of the board to act as a stop for the slates, which are then laid side by side on the board so that the bottoms of the slates are tight against the wood strip. Lay as many slates, face up, as the board will allow (maybe 10). Mark your slates at either end of the board and snap a line across the exposed surface of the slates *to mark the bottom of the overlying course*. "You are now ready to start slating the turret."

O'Hare explains, "The bottom course of slates is the most important as this has to be even round the turret. If this course isn't level, then the rest of the courses won't be level. There are many ways to ensure the slates are getting the correct overhang." One way is to use a tape measure and check the overhang on the starter course as you nail it around the bottom edge of the turret. O'Hare has done it enough times that he can simply use his finger as a measure. The author prefers a 1.5" slate overhang. Others may prefer a 2" overhang.

Instead of a cant strip under the starter slates, O'Hare finds that the carpenters in Scotland typically build the fascia board in such a manner that it acts as a cant, lifting the starter slates enough to give them the angle they need to lay properly. If a cant strip is used, it must be installed in short lengths. Such short pieces may need to be drilled and then screwed into place to prevent splitting of the wood. For 10" wide slates used as the first course on the bottom of a rounded turret, 10" long cant strips will do nicely as will 10" wide starter slates. For example, the rounded turret shown at left is slated with 10" x 20" slates, which have an 8 1/2" exposure. Therefore, the starter slates are 10" wide and 12" high, thereby creating a 3 1/2" headlap at the bottom of the turret. The starter slates are staggered so that the side joint on the first course of slates above the starter course falls right in the center of the starter slate. The remaining slates on the turret are all cut from 10"x20" stock.

What about the nail at the top center of the turret? This is used as an anchor for a string that hangs down over the turret roof as a slate-trimming guide. You can use a simple chalk line for this purpose — hook the end of the string over the nail and let the chalk box hang down over the eave of the turret. O'Hare explains, "Once you have positioned the first slate onto the roof, this is where the string line comes in. Hold the line at either [bottom] corner of the slate and mark the angle at which to cut the slate. It is important to try and maintain half bond [half side-lap] on the slates, but it isn't always possible. Concentrate on keeping the slates going round the turret even. I nail all slates three times — one at the head of the slate and two at either side. As I progress up the turret and the slates get narrower, I notch either side of the slate with my slate knife and [nail] the side nails into the notches. Use the string line as a guide to achieve a correct angle. We always cut the bed (rear) of the slates with a slate knife. Every slate has to be cut so that the slates go round the turret."

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All Photos this page by Joe Jenkins





# TOP 10 MISTAKE 2

## When Installing New Slate Roofs

by Joseph Jenkins



As a slate roof consultant, I travel around the country looking at slate roofs, both old and new. Some are ancient and just need inspected and evaluated; others are brand new — and leak. I am currently involved in five slate roof litigation cases as an expert witness — all residential structures with roof work ranging in cost from \$20,000 to \$350,000. I see the same mistakes over and over on new slate roofs, and they're hurting the long-term prospects of the American slate roofing industry. Here are the top ten mistakes, in no particular order.

**1. Lack of information:** The contractors (and homeowners) have not done their homework. The contractor blindly bullies ahead with the job without making any effort whatsoever to do any research. A simple search on the internet can yield a wealth of information about slate roofs, sources of correct tools, materials, supplies and installation techniques.

**2. All slate is not the same:** You wouldn't buy a car without looking at different models and checking their track record — and cars only last ten years and are cheaper than slate roofs! A slate roof is an investment in the future of your building. It will reasonably last 150 years if constructed correctly. There are many different types of slate with differing characteristics and longevities. Why buy a foreign slate with no track record? Do the research.

**3. The contract documents are deficient:** Every detail about the slate roof installation should be included in the contract documents — type, size and origin of the slate; type, length and gauge of the nails; type and installation style of underlayment; type and size of cant strip; headlap; flashing specifications; number of squares to be installed; slate installation style, and many other details. A basic contract ("*Sample Slate Roof Installation Proposal*") is posted at [slateroofcentral.com](http://slateroofcentral.com). Look under "Articles and Information."

**4. Lack of headlap:** This fundamental detail of any successful slate roof installation is hard to overlook, but it is ignored by some roofing contractors. Lack of adequate headlap spells disaster for a slate roof. I have seen new roofs with inadequate headlap (i.e. less than 2"), no headlap at all, and even negative headlap. Do your homework, contractors, or stay away from slate roof jobs.

**5. Bad flashing work:** There are two things that keep water from penetrating a slate roof: the slates and the flashings. Not only must the flashing metal be of adequate type and gauge, but it must be installed correctly. This is not rocket science, but it does require some training and/or experience in order to be done correctly and to be leakproof.

**6. No consultant was used on the job:** As a consultant, I am called on *after* the work has been completed and the roof has failed — this is a mistake. Professional advice should be obtained *before* the roof is installed and even before the structure is built, if possible. However, not all slate roof installations require a consultant. Homeowners can educate themselves for very little money by simply reading a copy of *The Slate Roof Bible*, reading past *Traditional Roofing* articles online at [traditionalroofing.com](http://traditionalroofing.com), and asking questions on the message board at [slateroofcentral.com](http://slateroofcentral.com).

**7. Contractors walking on the slate:** This is one of the worst problems with new slate roof installations. Roof slate is not to be walked on — period. It is not a floor that is being installed — it is a roof. The roof must be properly staged so the roofers are working off roof ladders and roof scaffolds. If the contractors are walking all over the slate roof during installation, it's because they don't know what the hell they're doing and the property owner will have many headaches later when the slates start falling off. This is a guarantee. Good slaters know how to install slate, and they won't walk on a slate roof unless it's a last resort in an unusual circumstance.

There is an old joke that says, "How can you tell if a lawyer is lying? Answer: See if his lips are moving." Unfortunately, many roofing contractors also dwell at this ethical level of social strata...

**8. Poor sheathing materials:** The roof decking must last as long as the slate. A good roof deck should last the life of two slate roofs, or about 200 to 300 years. In any case, a roof decking material under slate must have a known longevity of at least 150 years. Materials that have been tried and proven for this purpose include lumber boards and battens from 3/4" to 1.5" thick rough-sawn, planed or tongue-in-grooved from a variety of species of wood. Plywood, laminated woods and particle boards are sub-standard roof decking materials for slate roofs and should be avoided. Yes, you can install slate on laminated or glued decking materials, but a compromise on longevity is likely

(CONTINUED ON PAGE 15)



## TOP TEN MISTAKES... (CONTINUED FROM PAGE 6)

to be the result. If a slate roof is to be built to last, the roof deck should be solid boards, not glued sheets of wood.

**9. Emphasis on underlayment:** This is a red herring. If a slate roof leaks, it's because it was installed improperly, not because of underlayment or lack of it. Properly installed slate roofs need no underlayment. The main purpose of the underlayment is to keep the water out of the building until the slate and flashings are installed. After that, if you could magically yank the underlayment out from under the slate, it wouldn't make a bit of difference in the functioning capabilities of the roof. Secondary purposes for underlayment include providing a good surface for chalk lines during installation, providing a minimal layer of insulation, and providing a cushion for when the slates are being slapped down during installation.

Barn slate roofs in the United States — and there were thousands and still are quite a few, mostly a century old or older — were installed without any underlayment whatsoever. This is true for some institutional buildings as well. Most of the older homes in the U.S. were installed with a standard single layer of 30 lb felt under the slate roofs. These homes are so old now that the felt has deteriorated to dust, but the roofs are fine. If the slates and flashings are intact, the roof will not leak, underlayment or no underlayment, even in a sustained driving rain. This is a proven fact, not a theory.


If a contractor or architect is insisting upon a beefed-up underlayment under a new slate roof installation, it means they believe the new roof will leak and that the underlayment will delay the entry of the water into the building. This is flawed logic and reveals a gross misunderstanding of slate roofs. Architects sometimes confuse slate roofs with ceramic tile roofs. Although tile roofs may require a substantial underlayment, slate roofs, properly installed, do not.

Underlayment does, however, provide a margin of waterproofing in the event a slate roof is damaged by wind, tree-fall, or other unusual circumstance. An acceptable slate roof installation today still typically utilizes a single layer of 30 lb. felt underlayment, doubled (half-lapped) when the need for a heavier underlayment is required (such as when a roof must be left exposed for a period of time before the slates are installed).

What about ice-damming? Increase the slate headlap along the eaves to prevent ice-damming, but do not rely on what's *underneath* the slate to keep the roof from leaking. If the slate and flashings are installed correctly, the roof will not leak. That is the beauty of a stone roof.

**10. Inexperienced roofing contractors:** There is an old joke that says, "How can you tell if a lawyer is lying? Answer: See if his lips are moving." Unfortunately, many roofing contractors also dwell at this ethical level of social strata — somewhere between cretin and ex-convict. It is an unfortunate fact that many contractors cannot be trusted to give sound and honest advice or information. Some are pathological liars, others are inept, unintelligent, ignorant,

naive or just crusty old drunks. But, boy some of them can talk a smooth line. This issue is exacerbated by property owners who don't get competing bids before initiating a contract; who don't educate themselves about the nature of the work prior to hiring a contractor; and who don't insist upon a detailed, coherent and comprehensive contract document. One major effort that is being made today to try to screen contractors for slate roofing purposes is the Slate Roofing Contractors Association of North America, initiated on March 1, 2005. It lists contractor members on two websites: [slateroofers.org](http://slateroofers.org) and [slateroofcentral.com](http://slateroofcentral.com). Included with the listing is a Contractor Profile which reveals details about the contracting firm that the average consumer would want to know. There is more information about the SRCA on page 17 of this issue of *Traditional Roofing*.

Bad slate roof installations are seriously harming the slate roofing industry. One university administrator told me he had slate roofs installed on his dormitories because he wanted "the best roofs money could buy." Then, after five large slate roofs had been installed on his campus by the same roofing contractor, it was discovered they had been installed with only 1.5" headlap, or none at all. The discovery of this gross deficiency left the administrator stunned, shocked and disgusted. He never wanted to look at another slate roof again. Who can blame him? 

### Partners

by Thomas Edmond Raboin

While putting tools to rest  
In trailing light of day  
I visualized the many monuments  
That we've created along the way  
That will live as our memorial  
When we have turned to dust.

Certain of my tools  
Have formed with me a bond  
Their shining faces glisten  
From work we carry on.

Somewhat worn, functional still  
Forming a part of my iron will.  
To leave my mark upon the land  
Is something I must do  
Before I rest my weary head  
And bid this world adieu.



## READERS WRITE

(CONTINUED FROM PAGE 13)

*I am having my roof installed next week. I ordered the slate myself and ordered random width. Is there anything special the roofer should know regarding installation of random width vs uniform?*

**TRADITIONAL ROOFING:** Random width slates are not hard to install. The slater has to keep an eye on the sidelaps, but that's about the only additional thing. The guy bringing the slates up to the roof has to make sure he's blending the widths according to the proportions available. For example, if you have 20% 8" wide, 40% 10" wide and 40% 12" wide, then he should bring up two 10" and two 12" for every one 8" slate. Other than that, there's not much else to it.

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*My roof was constructed at an 18 degree pitch with 38x38mm battens covered with underlayment and the slate tiles nailed to the battens. It's leaking so badly that there is sagging of the battens. Please correct me if I'm wrong but what I would like to do is, 1) Remove tiles, underlayment and battens; 2) Apply new battens nailed directly to roof trusses; 3) Apply slates tiles to battens with copper nails. Please advise if the above exercise will work, if not please can you suggest an alternative!*

**TRADITIONAL ROOFING:** Minimum slope for slate roofs is 4:12. (around 18 degrees). You must have 4" of headlap on the slate at that slope, or more. If you re-lay the slate with the proper headlap and don't allow anyone to walk on it during installation or after, you should be OK. Replacing the battens with boards will help (you can use 1" rough sawn lumber or 3/4" planed, kiln-dried lumber — either will work fine). 30 lb felt paper over the boards and under the slate, half lapped (i.e. two layers), would also be a good idea at this low slope.

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*I am a professional engineer called upon to determine whether or not a hailstorm caused damage to a slate roof. I should note that it appears to me (from your guidance in "How To Identify Your Slate" at [slateroofcentral.com](http://slateroofcentral.com)) that the roof is a blend of Vermont greens and gray with a little New York red mixed in. I found a broken piece of slate on the ground (approximately 4" long along the bottom edge by 3" irregular) that has a distinct circular (3/8" diameter) rusty deposit on the underside within 1/2" of the lower edge. Can it be that the nails have pushed out, similar to nail pops in drywall, to cause enough stress to fracture the slate?*

**TRADITIONAL ROOFING:** Vermont slate is pretty resistant to hail damage. Hail damage is indicated by holes with the


back of the slate broken out, i.e. the holes have clean edges (not beveled) on the impact side of the slate (the side facing the sky). Holes in slate originating from inside the building (from gunshots, for example), would have the beveled edges showing on the *outside* of the slate. Yes, nails will push against the underside of the slate and sometimes wear a hole in the slate. In this case, the beveled edges also show on the top (outside) of the slate. This phenomenon happens when the slate underneath was "under-nailed," (the nail was not driven down far enough), or when the nail was driven into a knot in the wood (for example) and the nail was then forced back out a little as the wood dried. It's unlikely that the nail stress would have "popped" or broken the slate. Typically, the nail simply wears a clean hole in the slate, as shown in *The Slate Roof Bible, 2nd Edition*, page 220 (which is a drawing made from a photograph). Below is a photo of hail damage on a 75-year-old mixed-color Vermont slate roof which suffered massive hail impact a few years ago. Notice how beat up the metal vent is, but of all the slates around it, only one slate was perforated by the hail. This is what one typically sees when a slate roof is hail damaged — spotty damage to the slate here and there that can be repaired by simply replacing the damaged slates. The bigger issue is whether the flashings need to be replaced. If so, this can usually be done without removing and replacing the entire roof. 



Photo by Joe Jenkins

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America's most popular slate roofing web site!

for all your  
slate roofing  
needs



## READERS WRITE

*I need to find some method to reliably penetrate a slate roof with a vent flashing.*

**TRADITIONAL ROOFING:** First, find the exact spot on the underside of the roof in the attic and drive a 16-penny nail through the roof, right through the slate, from inside out. Then go on top (use a hook ladder, if needed) and find the nail. Push the nail down and then pull the slates off the immediate area, using a slate ripper, until the wood roof deck is revealed. Pull off enough slates to make the job easy — they're easy to pull off and to put back (you may need to remove 6-10 slates depending on the size of the slates, maybe more). Cut the hole in the wood just big enough to allow the pipe through — use a hand-held hole saw or a cordless circular saw. Insert the pipe through the roof from inside. Begin to nail the slates back down from the bottom course up, cutting them with a slate cutter to fit around the pipe. If there is a hole needed only in the center of a slate, draw a circle with a nail on the back of the slate, then punch along the line with the pointed end of a slate hammer to perforate the line, then break out the hole. If you need extra nail holes to nail a slate back into place (such as two nail holes on one side of a slate) punch the extra nail hole above the existing hole with the slate hammer. Fit the pipe flashing over the pipe before the top courses of slate are installed so the slates will overlap the flashing properly, then trim the top slates to fit around the flashing as you nail them into place. The very top row of slates can be installed with either slate hooks or bibs and nails. The pipe flashing can be a standard aluminum/neoprene or copper/neoprene flashing or a custom made lead or copper flashing (avoid all plastic or all rubber flashings). Lead pipe flashing fabrication is illustrated in the second edition of *The Slate Roof Bible*. The tools, the book and the copper/neoprene flashings are available at [slateroofcentral.com](http://slateroofcentral.com) or by calling the phone number at the bottom of this page.

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*I am an architect building my own home using a slate roof. Virtually every roof detail I can find on slate roofs is for unvented roofs. The Slate Roof Bible as well as the documents linked by the Jenkins web site make numerous references to slate over rough sawn lumber as a "breathable roof." It seems reasonable to me that water vapor is not going to get trapped underneath a traditionally framed slate roof. Is this presumption correct? Can you provide appropriate references regarding the appropriate venting of a traditionally framed slate roof system? Is it going to need ridge vents, soffit vents, or an air cavity between the roof deck and the insulation?*

**TRADITIONAL ROOFING:** The issue of traditional slate roofs being "breathable" roofs lies in the fact that such roofs are typically installed on board decks. Each board has an air space between it and the next board. That space may be 1/8" to 6", depending on the installation method used. A

stone roofing system nailed over a board deck allows some air penetration through the roof, but not water penetration. It is water-tight, but not air-tight. Thirty pound felt underlayment initially acts as an impediment to air flow, but does not block it completely. This is why century-old slate roofs with no specific roof ventilation system, insulated or not insulated, function quite well, provided that standard principles of insulating are followed (i.e. warm air is not allowed to contact cold surfaces). Contrast this to plywood roof decks covered by self-adhering asphalt roll-roofing and self-sealing asphalt shingles. There is little opportunity for air to breathe through this sort of roof system, hence, roof ventilation systems are imperative.

Generally, you should leave an air space between roof insulation and the roof sheathing (assuming the insulation is installed between the rafters) to allow for air flow through that air space so the space maintains the same temperature as the outside air. In addition, you should install a vapor barrier *interior to the insulation in cold climates* to prevent moist, warm air from coming in contact with a cold outer surface such as the underside of your roof decking. Condensation inside roofs is caused by warm, moist interior air infiltrating to the underside of the cold roof sheathing. This is prevented by the aforementioned vapor barrier, proper insulation, and proper ventilation of the roof space. Ventilation is most often achieved by gable-end vents or low-profile roof vents, but can also be achieved by ridge vents when there is no gable wall available. There is information illustrating the installation of vented slate ridges at [slateroofcentral.com](http://slateroofcentral.com) (click on "How to Install a Slate Roof," then look for the next link). It should be pointed out that there are many thousands of century-old slate roofs in the U.S. that never had any ventilation system incorporated into their design, and that these roofs are still functioning quite well today — after a hundred years. This seems like a rather strong testimonial on behalf of traditional roofing methods and materials, i.e. board roof decks, 30 lb felt, and stone roof coverings.

\*\*\*\*

*I am curious to know if you would consider it a good or bad practice of setting all hips and ridges in a solid coating of a high quality flashing cement.*

**TRADITIONAL ROOFING:** Bad. Frankly, the setting of slates in roof cement creates a long-term problem related to maintenance and restoration. One unique quality of a slate roof is that it lasts so long, and one reason it lasts so long is because it can be taken apart and put back together — in other words, maintained and restored. When the slates are glued to the roof, or to each other, they cannot be removed without damaging the roof. Every time the slate roof mechanics at Joseph Jenkins, Inc. run into a roof where slates have been glued down with roof cement, they begin

(CONTINUED ON PAGE 8)



## READERS WRITE

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uttering a long series of profanities that usually lasts until the repair work has been completed. The better approach to the issue of hips and ridges opening up over the years is to install step flashings under the hip and/or ridge slates. This is a permanent, effective solution that allows the roof to be easily repaired or maintained years later when, for example, a tree branch falls on it. In short, we discourage the use of roof cement or other adhesives under slates anywhere on the roof except in unusual situations, such as: 1) exposed gable edges subject to wind damage, and 2) small pieces of slate that require a little extra holding power, which could be a narrow piece on a gable end, a small piece on a tower hip, etc. Routinely using roof cement under slates is a mistake. You can see an example of a slate ridge being installed with copper step flashing at [slateroofcentral.com](http://slateroofcentral.com) (click on "How to Install a Slate Roof," then follow the links to slate hips and ridges).

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*My concern is the prices of new slate, which, by my opinion, as with many other contractors, is quite expensive.*

**TRADITIONAL ROOFING:** When the price of the material is compared with the expected life of the material, and other considerations are included such as aesthetics, natural vs toxic, etc., then it can easily be argued that slate is not as expensive as the "cheap" stuff (which is short-lived and has to be regularly replaced at increasing cost, creates toxic waste upon disposal, produces environmental toxins during production, looks ugly over its lifetime, etc.). When one considers that almost all average houses in the northeast U.S. had slate roofs on them at one time, back when people were frugal and living by modest means, then one might ask what has changed today. At that time, people bought slate for their roofs without question because they wanted good, beautiful, long-lasting roofs. Now, slate roofs are considered by some to be too expensive. The difference is 1) people today can buy very cheap roofing materials, and 2) people generally don't live in the same house very long and therefore don't care whether the roof will last a long time. I don't think the solution is to try to produce cheaper slates. I think the solution is to market slate roofs to those people who value quality and are willing to pay for it. Remember, *you get what you pay for.*

\*\*\*\*

*I am in the midst of restoring an 1860s home complete with a slate roof. Unfortunately, the original box gutters were torn out and replaced with plywood and asphalt shingles. I would like to go back to the original design and would appreciate any information you can give me.*

**TRADITIONAL ROOFING:** There are copper sheet metal sources in *The Slate Roof Bible, 2nd Edition*. There is also some information in the book about replacing box gutters,

including drip edge detail and installation sequence. [Slateroofcentral.com](http://Slateroofcentral.com) has illustrated information about both replacing box gutters as well as installing a copper snow apron over an area that had once been box gutters but was replaced with plywood and asphalt shingles, like your situation. Go to "How to Install A Slate Roof" and follow the links. Remember, when installing box gutters, expansion joints are required every 30 feet or so. If you are installing expansion joints, end one gutter at a high point and butt the end against the end of the next gutter section (leave an inch or so space), then place a copper cover over the gap. That allows the gutter to expand and contract. This is also illustrated at [slateroofcentral.com](http://slateroofcentral.com).

\*\*\*\*

*Can you tell me what would be the best nail to use for natural slate roofing?*

**TRADITIONAL ROOFING:** Copper nails will outlast galvanized nails and stainless steel nails will outlast both. If the slates are new, you should use either copper or stainless. If the slates are salvaged and not expected to last more than 50 more years, hot-dipped galvanized nails will do. Stainless nails are stronger than copper and may work better on some old, hard oak or yellow pine roof decks. However, stainless nails are also harder than copper nails to pull out when repairing the roof. Copper and stainless steel roofing nails are available from [slateroofcentral.com](http://slateroofcentral.com) or by calling the phone number at the bottom of this page.

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*Can you tell me if it is customary to use or not use an aluminum drip edge on a slate roof?*

**TRADITIONAL ROOFING:** Aluminum drip edges are not used on slate roofs. They are designed to prevent asphalt shingles from sagging over the edge of a roof. Slates don't sag. In fact, no metal drip edges were ever used on traditional slate roofs — neither on the drip edge nor on the rake edge. The practice of using metal edges on slate roofs is a recent one that has been promoted by asphalt shinglers who typically use plywood roof decks. Metal drip edges do not reflect traditional slate roofing techniques and can be avoided altogether by traditional slaters.

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*I have been told that one can judge the quality of a slate by tapping it with a metallic object. The harder slates have a ring, and softer slates sound duller. Is this an accurate test of (1) the quality of the slate or (2) the useful life remaining in a slate?*

**TRADITIONAL ROOFING:** The answer to your question is complex. There are subtle nuances involved in determining the quality of used slates. The ring is part of it, but many older slates (100 years old) do not ring like new slate does. New slates should always ring well, unless they're cracked. The

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## READERS WRITE

(CONTINUED FROM PAGE 8)

best way to know if an older slate is any good is to know what type it is, what approximate age it is, and then examine it visually for surface delamination and softness. Punching a nail hole in the slate with a slate hammer or cutting it with a slate cutter will reveal the hardness or softness of the slate, although an experienced slater can tell the quality of a piece of slate by simply holding it and looking at it. Even a reputable, old, hard slate with a degree of softness can last many decades re-nailed to a roof. Slates that are notorious for not being reusable when old are some PA black slates (while other PA black slates have quite high degrees of longevity). Some Vermont sea green strains can also become soft after 115 years, although most don't. Generally, if it's salvaged American slate and it looks like a good, smooth piece of dense stone while holding it in your hand, then it will most likely make a good roof.

\*\*\*\*

*About two years ago, I purchased an 80-year-old home with a Vermont "sea green" slate roof. Last spring I noticed a leak, and as I am not as young as I once was, I decided to look for a contractor. To make a long story short, I was very dissatisfied with the work this company performed. My objective in writing this is two-fold: first to let you know the working ethics of at least one of the companies you recommend on your web site, and second, any pressure you may be able to exert on the roofing company on my behalf will be greatly appreciated.*

**TRADITIONAL ROOFING:** We do not recommend any roofing contractors on our nationwide online Directory of Slate Roofing Contractors. We once had a list compiled from voluntary submissions that were simply posted on our website for the convenience of the public. There had never been any charge to any contractor for inclusion on that Directory and none of the contractors were screened in any way. We posted a large, bold disclaimer to this effect right on the top of the Directory.

That said, please be aware we have discontinued our voluntary contractor directory at [slateroofcentral.com](http://slateroofcentral.com). Instead, we have replaced it with a Directory of **Slate Roofing Contractors Association** members who pay a fee to be included in the Directory and who fill out an extensive membership application revealing their level of experience and other important aspects of their contracting capabilities — information that is posted on the Directory as a Contractor Profile. We are now only listing roofing contractors who are willing to be scrutinized, willing to abide by a Code of Ethics, willing to allow their Contractor Profile to be publicly displayed on the website, and willing to pay a fee for this service. This has knocked out a lot of the dead wood from the old, original Contractor Directory.

\*\*\*\*

*I hired a contractor to replace my copper valleys. Thanks to your advice I told him I did not want him to slip the new val-*

*ley over the old valley which he mentioned was an option to save money and time. While he was removing the slate, he was breaking almost every piece. The next day, when I came home from work, I noticed he had done three dormers in the same time it took him to do one the first day. I climbed up on the hook ladder to check out the work and discovered he had given me the VALLEY SLIP and he also broke over 70 pieces of hard Vermont slate. I called him up and told him to get his stuff and get off of the job. He said he used the slip method only because he was breaking too many slates. He told me that at this rate he would have used up my remaining 150 pieces to do 75 feet of valley. How many slates can I expect to replace because of breakage on an average hard Vermont thick slate roof that's 90 years old when an experienced slate roofer is replacing valleys?*

**TRADITIONAL ROOFING:** A hard Vermont slate roof should experience little if any breakage when valleys are being replaced. However, if the valleys are tarred, or if they have been walked on over the years, breakage will increase. Typically, a hard Vermont slate roof may have 5% breakage along a valley, if that. Sometimes there's no breakage at all. Sounds like your contractor had no idea what he was doing. He should have read *The Slate Roof Bible* (which has an entire chapter on valleys and valley replacement) before he dove into that project.

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*My roof expert says that New York has adopted national codes and that self-adhesive asphalt ice shield on a pitched roof is now code. Can you tell me if this is so?*

**TRADITIONAL ROOFING:** You need to look at the code yourself and see what it actually says. The International Building Code of 2000 states that in areas where the average daily temperature is 25 degrees Fahrenheit or less, a double layer of felt cemented together or a layer of self-adhesive ice shield are required at the eaves. However, traditional slate roofs were never installed in this manner unless there was a particular need for a heavy underlayment, meaning an extraordinary expectation that the roof would leak. Ice damming problems are often caused by a lack of insulation in the roof of a heated building. The ice and snow melts from the roof, then freezes at the unheated eaves causing an ice build-up that can allow water to penetrate the roof at the eaves, especially at weak points. It's much better in ice-dam prone climates to properly insulate the roof and to reinforce the eaves during the roof installation by increasing the headlap there. Beefing up the underlayment is a temporary waterproofing measure that will not last nearly as long as the slate itself. It is unwise to rely on the underlayment to keep a slate roof water-tight. A properly installed slate roof requires no underlayment to be completely water-tight during its lifetime.

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(CONTINUED ON PAGE 14)



# Nothing Matches the Beauty and Longevity of Vermont Slate

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**Semi-Weathering  
Vermont Gray**



**Unfading  
Gray**



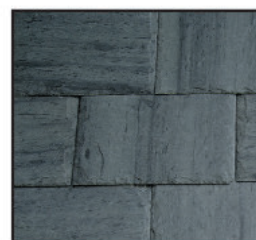
**Semi-Weathering  
Sea-Green**



**Unfading  
Green**



**Mottled Green/Purple**



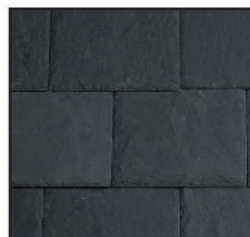
**Mottled Gray/Black**



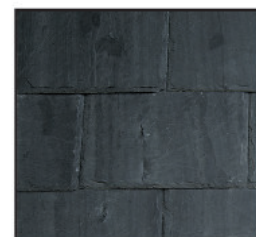
**Royal Purple**



**Unfading Black**



**Semi-Weathering  
Vermont Black**



**Vermont Black**



## CAMARA SLATE PRODUCTS

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# PROJECT SPOTLIGHT CATHEDRAL OF SAINT ANDREW


LITTLE ROCK, ARKANSAS

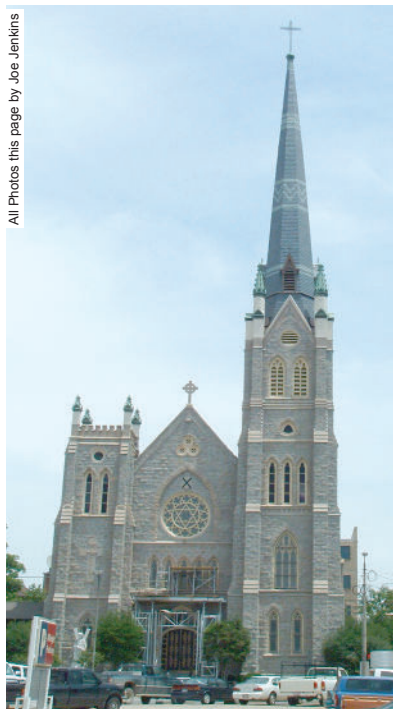
It's not very often anyone has an opportunity to slate a cathedral, but such a monumental project was recently undertaken by Midland Engineering of South Bend, Indiana, on the Cathedral of Saint Andrew in Little Rock, Arkansas. The project was coordinated by Monsignor Scott Marczuk who had correctly ascertained, with the aid of a roof consultant, that the original 120-year-old slate roof had reached the end of its life and needed to be replaced. The original slates were about two thirds Pennsylvania black, which were deteriorated beyond repair, and one third Vermont unfading green, which were still quite sound despite their age. When the original slates were removed, many were salvaged and used for fund-raising by the church to help pay for the new roof. It is worth noting that the original slate roof reportedly had no underlayment.

The Cathedral consists of a main roof with transept and parapets, plus a 220-foot octagonal spire, an attached rear chapel and an attached rear dome totaling 245 squares. The slate was originally installed in an intricate pattern of green slates over a black slate background — a pattern meticulously replicated by Midland during the roof replacement.

The roofs had been slated in 1881 at a cost of \$1,951.50, including labor and materials. Prices have gone up since then, and so has the quality of flashings and nails. Although the original flashings were tin and copper, terne-coated stainless steel flashings were used on the new slate roof in the valleys, box-gutters, ridges, chimney flashings and step flashings. Four-pound sheet lead was used for counter-flashing against the rough stone parapets. Stainless steel slater's nails were used on the main body of the cathedral in order to penetrate the old yellow-pine sheathing more easily.

Master slater Lyle Bandurski (below, right) and project manager Steve Kurtz (above) teamed up to construct a beautiful roof of Cwt-y-bugail Welsh slates blended with Vermont unfading green slates, both from Hilltop Slate in Middle Granville, NY. The project won the Historic Preservation Alliance of Arkansas's Outstanding Craftsmanship Award, an annual award presented in Arkansas for "outstanding achievement in historic preservation."

Midland Engineering can be reached at 52369 US 33 North, South Bend, Indiana (ph: 574-272-0200) or at [midland-engineering.com](http://midland-engineering.com). Hilltop slate can be reached at PO Box 201, Rt. 22A, Middle Granville, NY 12849 (ph: 518-642-2270) or at [hilltopslate.com](http://hilltopslate.com). 





# ONE WAY TO SLATE HIPS AND RIDGES

All Photos by Joe Jenkins



1) Nail or screw furring strips to both sides of the hip or ridge. The thickness of the strips must be 3x the thickness of the slate. 2) Install the slate in the field of the roof right up against the wood nailers. Always use two nails per slate.

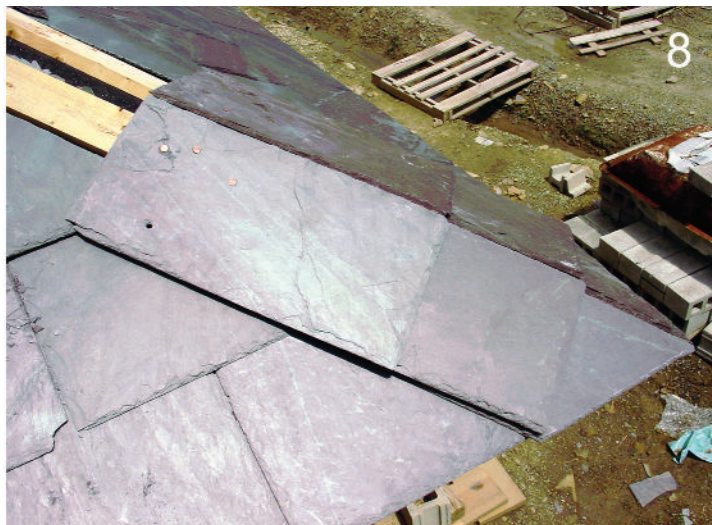


3) Start with a piece of flashing at the bottom of the hip, cut at an angle to match the roof contour. 4) The flashing should be folded at the bottom to cover the end of the nailers. This is 20 ounce copper, but a lighter gauge is suitable.



5) Install the first pair of slates over the flashing, also cut at an angle. 6) Install the second piece of flashing.





7) Install the slates in pairs, two at a time, not one side at a time. Butt them tight against each other before nailing them into place. Nails can be 2.5" long of copper or stainless.  
 8) Add another step flashing, then another pair of slates.  
 9) This step flashing is 10" long and 8" wide, folded down the center, on 8"x16" hip slates. The hip slates overlap each other by 8" (halfway). The step flashings overlap each other by two inches. 10) Continue installing the slates in pairs, covering each pair with a piece of flashing, until the hip is slated. No caulk, adhesives or roof cement are needed or recommended on the hip (but caulk the seam on the horizontal ridges). 11) The watertight job is permanent.



**no caulk or roof cement is needed on or under the hip slates**

Caulk horizontal ridge slates at seam only. Do not caulk hips. Do not apply adhesives under slates because adhesives interfere with future maintenance.



When installing horizontal ridges in this manner, a good quality caulking seal at the ridge is recommended.

All Photos by Joe Jenkins