

How to Preserve a SLATE ROOF

By Joseph Jenkins

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Figure 1: Vermont unfading green slate date on a Vermont purple slate background, photographed in 2003 at 143 years of age and still going strong.



Figure 2: Vermont purple slate with a Vermont unfading green slate date, located near Fair Haven, VT. At 152 years of age this roof could still function admirably for generations.



Figure 3: Standard slate installation. All slates are the same length and width. What you see is only the bottom part of each slate — most of the slate shingle is overlapped by the slates above. In fact, each slate is overlapped by the second row above it by three inches. This critical overlap is called the “headlap.”

Slate roofs are the world's finest roofs. They're fireproof, waterproof, natural, will last centuries, and they have a track record that goes back thousands of years and spans the entire Earth. They are beautiful, simple roofs made of rock on wood — ingenious, effective, and fabulously successful. Yet, in the United States, they have been under intense and relentless attack for decades, destroyed by the thousands, cast away and forgotten. The culprit, in one word, is ignorance — in two words: roofing contractors. Slate roof owners are now plagued with two problems: roofing contractors who do not understand slate roofing systems, or no slate roofing contractors at all. If a slate roof is in need of repair, maintenance or restoration, what's a roof owner to do?

The best way for someone to protect a slate roof is to first become informed. It is very common for slate roof owners to face a continuing onslaught of roofing contractors wanting to tear off their slate roofs. The author of this article, a slate roof restoration professional and consultant, has seen time and time again when a perfectly good slate roof has been condemned by not one, but several roofing contractors, who have informed the owner that the roof must be replaced. These are good, sound, slate roofs that have fifty or seventy-five years of life remaining, maybe more. The number-one threat to slate roofs on vintage homes today is poorly informed, inexperienced roofing contractors looking for a house on which to staple cheap, asphalt shingles. In effect, roofing contractors are the predators and slate roof owners are the prey. Owners can best protect themselves and their slate roofs by knowing more about the material that is covering their houses.

This article will, in a nutshell, cover the important points needed for a basic understanding of slate roofs and how they work. A good slate roof can easily last 150 years and maybe a lot longer. Examples of such roofs on simple buildings as well as high-class homes dot the New

England countryside (Figures 1 & 2) and are scattered across the United States and around the world.

The four basic elements of a slate roof include: 1) The slate itself. This should be a hard variety with a reputation for longevity. 2) The roof deck. This should be a board deck (not laminated wood) at least 3/4" in thick-

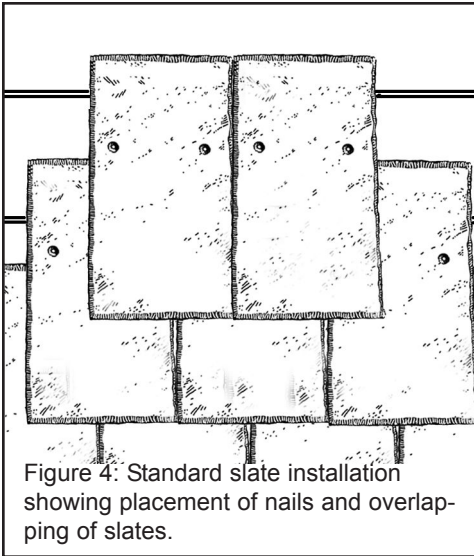


Figure 4: Standard slate installation showing placement of nails and overlapping of slates.



Figure 5: Random width slate installation.

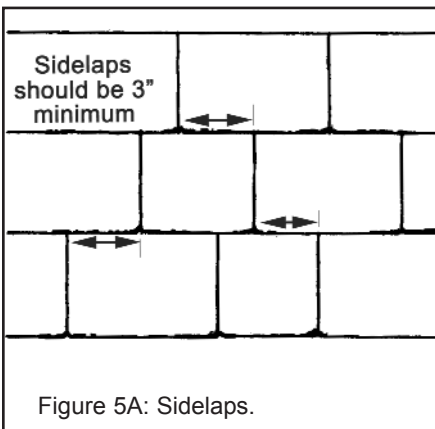


Figure 5A: Sidelaps.

ness. 3) The flashings (the sheet-metal joints between roof planes). These should be copper or stainless steel, although the old “tin” flashings will last quite a long time if kept painted and are easily replaced when they wear out. 4) The nails — they should be copper or stainless steel, but cut steel nails and hot-dipped galvanized steel nails will easily last a century or two on a well-maintained slate roof. These four elements make up a basic American slate roof — stone slabs attached with nails to a properly sloped wood roof deck and flashed where necessary with appropriate sheet metal. Such a roofing system is very simple, yet amazingly durable and long-lasting. What goes wrong with these roofs?

Slate is stone. It is pulled from the earth in heavy slabs and worked down into individual shingles, largely by hand. The fact that slate roofs are rock roofs is the basic reason why they last so long. However, stone is a natural material and may have invisible fractures or other imperfections that are not noticeable when the roof is installed. These can cause a slate or two to eventually break and come off the roof. People walking on slate roofs also damage them. This includes the roofing contractors who install or repair the slate. A “bigfoot” roofing contractor will crack slates which can later, after a freeze/thaw cycle or other environmental pressure, break apart. Broken slates can easily be replaced, however, as we will discuss below.

Some slate varieties are softer than others and do not last as long. Such slates will become flaky, and crumbly when they reach the end of their effective lives, which could be as soon as 55 years, but more likely around 80-100 years. These “soft slate” roofs cannot be saved or restored, but can easily be replaced with new or salvaged slates. Harder slates, such as most Vermont slates, the Peach Bottom slates, Buckingham slates, Monson slates, and others, could conceivably last centuries on a properly maintained roof.

Flashings eventually wear out. These are the metal joints around chimneys, in valleys, alongside dormers, around pipes that protrude through the roof, etc. They are also easily replaced by experienced slate roof restoration professionals.

Finally, bad workmanship, such as improper repairwork, plague many an old slate roof. This is visible as tar splotches on roofs, mis-matched slates, metal patchwork, coated roofs, and other mistakes. Once again, these errors can usually be removed and properly replaced by someone who knows what he is doing. Coated slate roofs cannot be remedied, however, and such a practice should be avoided.

For a better understanding of how slate roofs work, let’s take a look at how a slate roof goes together. First, there is the “standard installation,” which is the most common and basic way to install slate in the United States (Figures 3 & 4). Each slate is the same length and width. Each slate is fastened to the roof with two nails along a chalk line that marks the top edge of the slate. Note that each slate overlaps two courses below it. This is called the “headlap” and is usually three inches. The headlap is one element of a slate roof that is essential. Slate sizes, widths, lengths, colors, shapes, and thicknesses can all vary, but the headlap is a constant that must be maintained. A minimum three-inch headlap is standard, but greater headlap is acceptable. Less headlap can lead to leakage, depending on the slope of the roof (however, two inch headlap is common on older roofs with adequate slope).

A simple variation of the standard installation is the “random width” roof, which utilizes slates of various widths rather than just the uniform width of the standard installation (Figure 5). In this case, the “sidelaps,” as well as the headlaps, are critical. Sidelaps are the lateral spacing of the side-butts of each slate in relation to the course above or below (Figure 5A). The sidelaps, like the headlaps, should be a minimum of three inches.



Figure 6: Graduated slate roof. Slates vary in both widths and lengths. This roof also blends several colors of slate.

Slates can vary in both width and length. This is called a “graduated” roof because the slates graduate from larger slates at the bottom of the roof to smaller slates at the top (Figure 6). Again, proper sidelaps and headlaps must be maintained for the successful functioning of graduated roofs.

A random width installation can be modified into a “staggered butt” style, which utilizes slates of two or more lengths, fastened to the roof along chalk lines that mark the top of the slate as in the standard installation, but allowing the extra lengths of the slates to hang down, creating a unique look. This can be further modified by mixing slates of different colors and even different thicknesses to fashion a roof that is a work of art (Figure 7). In this case, the longer slates simply create a longer headlap. At no time is the three inch minimum headlap decreased.

Finally, the staggered butt style of slating can be further modified into a “ragged butt” style, which is simply done by cutting the exposed bottom edges of the slates randomly to create an inimitable roof (Figure 8). All of these slating styles are variations of the standard installation; all maintain correct minimum headlaps and sidelaps; all are leakproof if properly maintained (with or without underlayment), and all will last as long as the slate itself lasts, providing an Act of God, or a roofing contractor, does not destroy the roof first.

When a slate breaks after being installed on the roof, how is it replaced? This is easily done in the same manner in all cases: either with the “nail and bib” technique, or the “slate hook” technique. First, the broken slate must be removed. This is handily accomplished by using a slate ripper to hook the nails that fasten the slate to the roof. The hooked nails are then pulled out and the offending slate comes out with them (Figure 9).

A *matching* replacement slate is then slid into place and fastened with an appropriate roofing nail in the overlying slot, then the nail is covered by a bib flashing (Figure 10). An alternative to this is to use a slate hook to hold the replacement slate in place (Figure 11). Exposed strap hangers should *not* be used when replacing slates (Figure 12). These are unsightly and will open up, flatten, and allow the replacement slate to slip out if ice or snow should slide down the roof.



Figure 7: Staggered butt slate roof. Slates vary in widths, and lengths, and, in this case, colors and thicknesses. The top of the slates are lined up but the bottom is allowed to hang down.

The removal and replacement of slates on the roof is also necessary when replacing flashings on the roof. When flashing metal deteriorates and must be replaced, the slates that cover the flashing must be removed in order to allow the old flashing to be taken out. Once the old metal is completely out, new metal can be installed, after which the slates are replaced in their original locations. When the job is completed, the roof should look like the original roof, not like a repaired roof. This is routine work for a slate roof restoration professional.

Basic repairs require replacement slates that match the roof. This is one reason why many standard roofing contractors are not competent at the repair or restoration of *slate* roofs. Most roofing contractors today make their living by *re-roofing*, usually with a short-lived asphalt material such as fiberglass shingles. A good slater will stockpile a variety of salvaged slates — all different sizes, shapes and colors, or he will know where to get what he needs, perhaps



Figure 8: Ragged butt slate roof. Slates vary in widths, and lengths, and, in this case, colors. The top of the slates are lined up, but the bottom is allowed to hang down like a staggered butt roof, but the bottom edges are trimmed at random to create a unique look.

from a roof slate salvage yard. Sources of both new and salvaged roof slates and roof tiles are listed, for example, on the author's web site at jenkinsslate.com.

MYTHS AND MISINFORMATION:

1) Your underlayment (felt paper underneath the slate) has worn out and therefore you have to replace your roof. Wrong. Felt paper is installed when the slate is installed in order to keep rain out of the building until the roof has been completed. Once completed, the felt paper, now peppered with holes from the roofing nails, serves no useful purpose other than as a temporary semi-waterproof layer that will eventually turn to dust. Many century old slate roofs never had any felt paper installed under them whatsoever and are still functioning quite well, and leakproof, today. It is the slate and the flashings, *not* the underlayment,

that render the roof leakproof. However, you will find that many of today's roofing contractors of the asphalt variety (as well as architects) will argue until they are blue in the face that the underlayment is the most important part of the roof.

2) Your slate nails were not copper and therefore you have to replace your roof. Wrong again. Most older slate roofs were installed with either hot-dipped galvanized nails or cut steel nails. On a hard-slate roof, these nails will still be quite good after a century. On a deteriorating soft-slate roof, which allows some moisture to penetrate through the slates to the nails, the nails will be much more decayed. Soft-slate roofs will need to be replaced anyway. The roofs made of harder slates will not, regardless of the type of nail. In rare cases, entirely wrong nails were used in the first place to install the slate roof. This was the act of an unscrupulous roofing contractor and there is no remedy for it other than to replace the roof.

3) Roof slate is an obsolete material and cannot be bought today. Very wrong. Roof slate is still quarried in Pennsylvania, Virginia, Vermont and New York as well as around the world (and imported into the US). It is readily available new in any size, shape or color desired. There are huge deposits of it resting in the Earth — deposits that will never be depleted. There are also companies that specialize in salvaging older roofing slates. Salvaged slates can be bought to match just about any existing Period Home. A listing of sources of both new and salvaged roofing slates can be found at jenkinsslate.com.

4) Nobody repairs slate roofs anymore and competent slaters cannot be found. There is, unfortunately,

some truth to this. There are many "pretenders" who will declare themselves slate roofing experts when, in fact, they are simply blowing it out their wazoo. There are also many predatory roofing contractors who know that there is a dearth of competent slaters and they will lunge upon your house with dollar signs in their eyes knowing that you are over a barrel. In fact, there are many competent slate roofing professionals scattered throughout the country and they are increasing in numbers as more training, information, tools, equipment and networking become available. There is now a new professional association being organized, the Slate Roofing Contractors Association of North America (www.slateroofers.org), which will soon be listing screened, experienced professional slate roofing contractors on the internet.

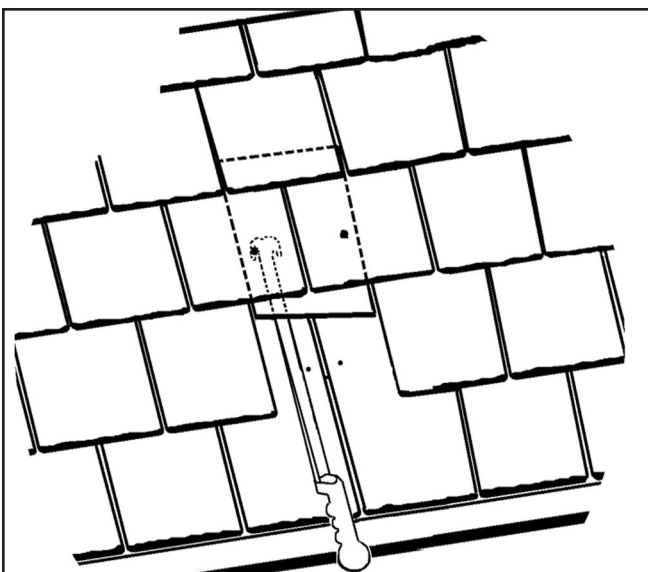
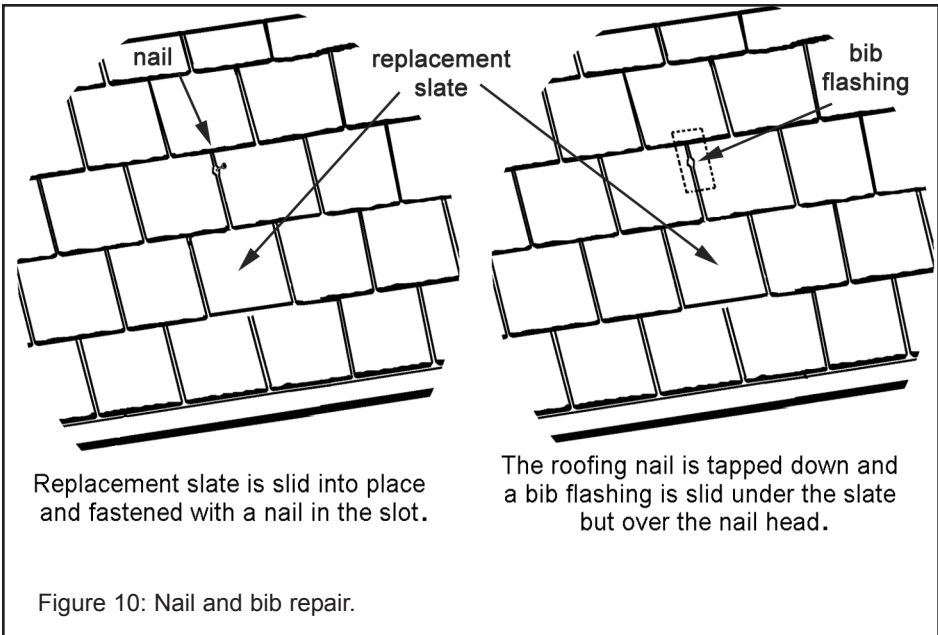


Figure 9: Using a slate ripper to remove a broken slate.

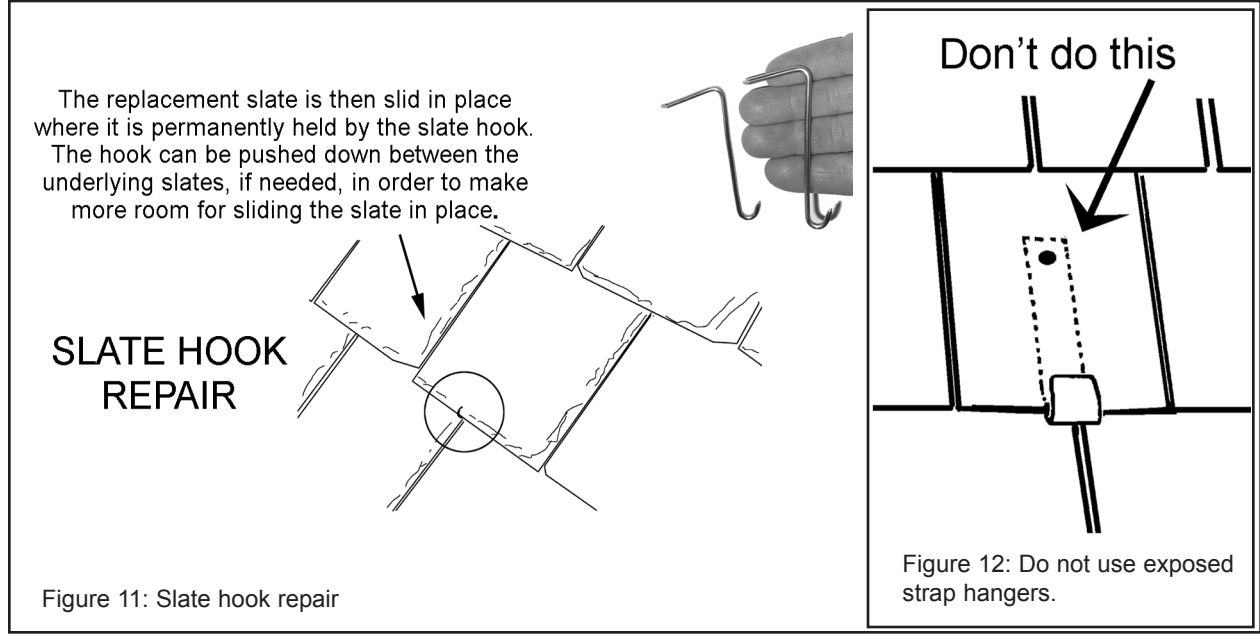
There are many other issues and topics involved in the preservation of slate roofs, such as safety issues,



accessing the roof, scaffolding, other tools and how to use them (slate cutters, slate hammers and ladder hooks, for example), how to identify roof slates, side-lapped slates, slated valleys, eyebrow dormers, ridges, hips, chimneys, underlayment, and a host of other styles, details and methods that would require an entire book to describe. Luckily, such a book exists in the form of *The Slate Roof Bible 2nd Edition — Understanding, Installing and Restoring the World's Finest Roof*, written by the author of this article. Furthermore, the author's web site at jenkinsslate.com has many pages of information available free to the public, including installation instructions, repair instructions

(for slate, tile and asbestos roofs), source lists, slate roofing tools, materials, supplies, a public message board, a page showing how to identify your slate, and a contractor directory.

If a slate roof owner is armed with the proper knowledge, understanding and information, she will best be able to protect and preserve the stone roof covering her home. With the help of a competent slate roof restoration professional, there is hardly a slate roofing problem that cannot be understood and solved.



SlateRoofWarehouse.com

SLATE RIPPERS, SLATE CUTTERS, SLATE HAMMERS, LADDER HOOKS, SLATER'S STAKES, COPPER NAILS, SOLDER BARS, SNOW GUARDS, SNOW RAILS, SOLDER IRONS, SLATE HOOKS, STAINLESS NAILS, COPPER RIVETS, SLATE ROOF BIBLE, TOOL SETS, CHICKEN LADDERS.