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Technical Bulletin #1

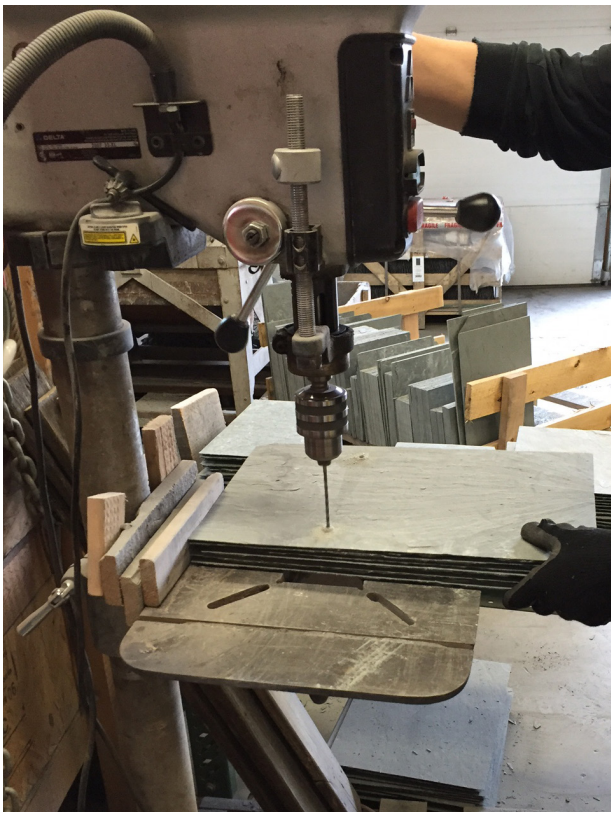
NATIONAL SLATE ASSOCIATION

Technical Bulletin No.1: Nail Holes

Each natural roofing slate is typically installed with a minimum of two nails. It is common to have the nail holes pre-punched or drilled by the producer or supplier with each hole located one-quarter to one-third down the slate length (measured from the head of the slate) and 1-1/4" to 1-1/2" in from each side. Slate measuring 3/4" or more in thickness and 20" or more in length are usually secured with four nails each. The two additional nails are placed approximately 2" above the regular nail holes. As slating is a craft, there may be some variance in nailing practices. Custom nail hole placement is possible and may pertain to the headlap used, installation method, specialty pieces (starters, hip & ridge slates, etc.), or other considerations. For wind-uplift protection, nails should be installed as low as possible, but not so low as to penetrate the heads of the slates in the course below. Ideally, the nail holes would be located on the thinner end of the slate shingle to prevent the overlying slate from being lifted in the ensuing courses.

Historically, the industry standard for commercial grade roofing slate was a nominal 3/16" thickness. Such slate was usually machine punched from its back side, which created a concave "blowout" area, or countersink, around the nail hole on the face of the slate to accommodate the nail head (i.e., providing space for the nail head to be driven flush with the surface of the slate; Figure 1).

Figure 1: Traditional punching machine (left) and a machine punched, Vermont Mottled Green and Purple slate (right).



Over time, the industry has adopted a thicker grade of slate as the standard that is now referred to as "nominal 1/4"-3/8" thickness." The thicker a slate, the more force is required to punch it. Thus, it has been found to be effective for these thicker slates to have their nail holes drilled, rather than punched (Figure 2). In addition, the punching of some harder grained slate can tear-back an excessive amount of material around each nail hole. By reducing the section (thickness) at the nail hole, excessive tear-back can compromise the strength of the nailing area and, when sufficiently large, direct rainwater driven below the slate shingles (either via capillary action or wind) toward the nail holes. Since drilling is generally less traumatic to a slate, it can yield a thicker, stronger nailing area.

Thicker slates also tend to have more variance in thickness and texture, and may not lay perfectly flat. These variances offer adequate room for clearance between the heads of the slating nails and overlying slates. This clearance has been helped by the modern copper nail, which has a thinner head (in some cases less than 1 millimeter thick) than that of the historical iron cut nail. The drilling of nail holes in roofing slate has also proved to be cost effective as multiple slates may be stacked and drilled simultaneously at the quarry or job site, while also reducing waste. Because of the increased thickness of slate shingles, advances of the modern nail, and ease of manufacturing, drilled nail holes have become widely used in the industry. Note that that some quarries are using a hammer drill to produce nail holes in their slate. Hammer drilling has the advantage of providing a countersink area for the nail head. Be aware, however, that, depending on the type of slate and the amount of pressure applied during drilling, hammer drilling can cause a bit too much blowout, thereby weakening the nailing area.

Punched slate may still be specified, when possible, as the spalled countersink gives the installer an added allowance from under/over nailing the slate, one of the most common reasons for broken slates on a roof. Unlike the drilling of slate, the punching of slate must be done individually, requiring more labor. This further handling may also act as an additional quality filter as each piece can be inspected yet again prior to packaging. However, considering the extra time, quality control, and loss due to breakage, punched slate may cost more. (It should be noted that because

Figure 2: Drilling slates on a drill press (top) and a drilled, Vermont Unfading Gray/Green slate (bottom).

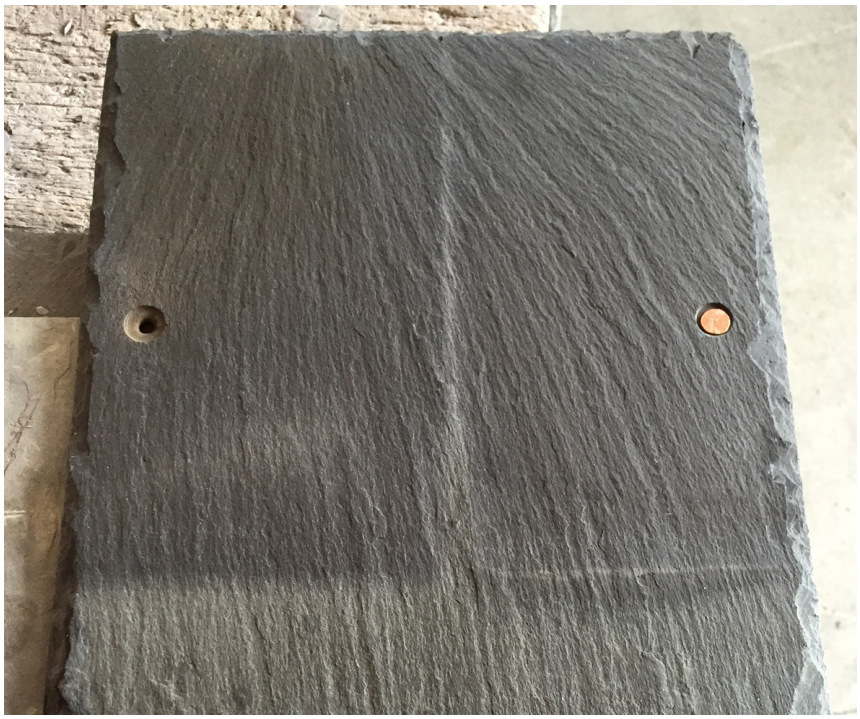


Figure 3: Drilled and counter-bored nail holes in a 100-year old slate from the Monson, Maine, district.

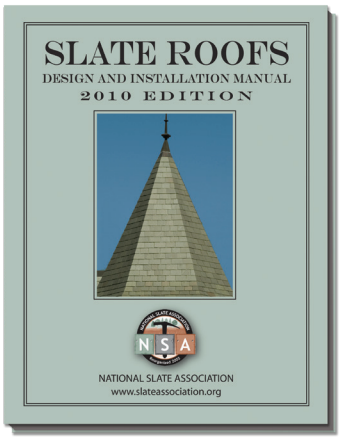
of the punching forces required, it has always been common practice to drill, rather than punch, virtually all slate that is 1/2" thick and thicker.)

Slate can also be shipped without holes (unpunched). This is common where slate is hung with hooks or where slate is to be inspected, graded and holes provided on site. Hip, ridge, valley and other transition slates are often supplied without nail holes to allow for specialty nail hole placement, or to maximize the usage of the shingles.

As an historical note, some slate was drilled with a special "counter-bore" drill bit, which left a countersink on the face of the slate around each hole for the nail heads. This was very common for some of the quarries in Monson, ME, but also found in some Buckingham, VA slate, Vermont unfading grays and greens, Vermont mottled green and purple slate and possibly others (Figure 3). Because of the significant time required to face drill each piece of slate and the cost of these special bits, this method is virtually obsolete in modern production.

Punched or drilled? We leave it for you to work with your quarry or distributor and to decide based on the type and thickness of the slate to be installed as well as the specific job requirements (type of slate roof to be installed – uniform, random, graduated, or textural – roof slope(s), type of nail to be used, etc.).

For more information on nails and nailing, please see *Slate Roofs: Design and Installation Manual,* 2010 Edition, available at www.slateassociation.org



For more information about The National Slate Association, visit **www.slateassociation.org**

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