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Technical Bulletin #16

NATIONAL SLATE ASSOCIATION

French Method Of Slate Roofing

Features

Like the Dutch Lap method of slating (see Technical Bulletin No. 6), the French method (sometimes called the Diagonal or Hexagon method) of installing slate shingles is a bygone, lightweight method of slating in which square slates, typically with one clipped corner, are rotated 45-degrees and laid on the diagonal, tip-to-tip (Figure 1). Although there are areas of triple overlap, the French method is considered a single lap method, with a 3" lap being standard. The lap could be decreased slightly on roofs with steeper slopes (roughly 20:12 or greater). Conversely, the lap should be increased on roofs with lower slopes (roughly 8:12 or lower), but the greater the lap, the less the reduction in weight

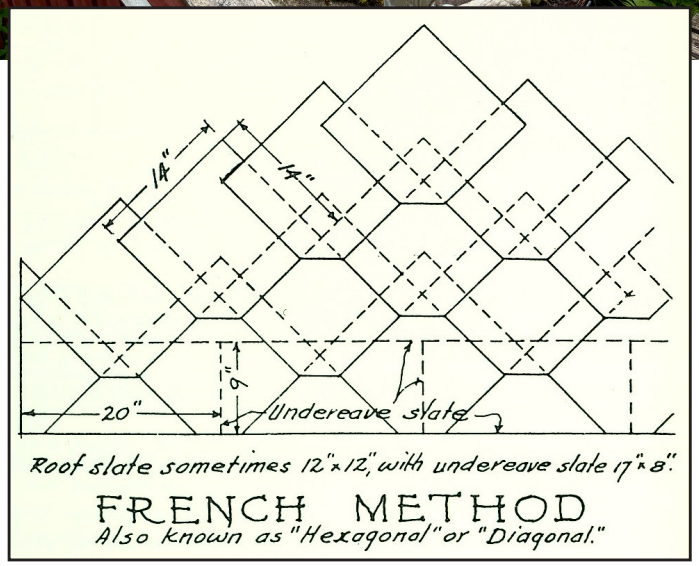


Figure 1: Detail drawing of the French method as shown in the first edition of *Architectural Graphic Standards* with the bottom corners of the shingles clipped, as is typical.[1]

Table 1: Weight Per Square - French vs. Traditional Method

SLATE THICKNESS	SLATE SIZE	METHOD OF INSTALLATION	EXPOSED AREA (IN.^{2})	PIECES PER SQUARE	WEIGHT PER SQUARE (LBS.)
1/4”	**22 x 12**	**Traditional, 3” headlap**	**114.0**	**126**	**935**
1/4”	**14 x 14**	**French, 3” lap**	**112.0**	**129**	**650**
1/4”-3/8”	**22 x 12**	**Traditional, 3” headlap**	**114.0**	**126**	**1,170**
1/4”-3/8”	**14 x 14**	**French, 3” lap**	**112.0**	**129**	**814**
1/4”	**16 x 11**	**Traditional, 3” headlap**	**71.5**	**201**	**935**
1/4”	**12 x 12**	**French, 3” lap**	**72.0**	**200**	**711**
1/4”-3/8”	**16 x 11**	**Traditional, 3” headlap**	**71.5**	**201**	**1,170**
1/4”-3/8”	**12 x 12**	**French, 3” lap**	**72.0**	**200**	**890**

relative to the traditional method of slating (i.e., slate laid with a true headlap based on the slope of the roof). The French method of slating is more vulnerable to wind-driven rain than the traditional method. As such, its use should be avoided on roof slopes of less than approximately 6:12 (it will be less visible from grade at such slopes anyway). Table 1 illustrates the reduction in weight achieved using the French method with a 3” lap compared to the traditional method using a 3” headlap.

Although lighter in weight than traditional slate and offering a different aesthetic, the French method was primarily reserved for use on secondary structures such as barns and outbuildings due to the greater propensity for wind-blown rains to penetrate below the shingles. The French method was not used widely, limited geographically primarily to the New England states, and even less so on buildings meant for human habitation. Further, not all quarries offered the shapes and sizes of shingles needed for the French method. Today, a special order would be required.

Two sizes were common in the past; 14” x 14” field slates with 20” x 9” starter (undereave) slates and 12” x 12” field slates with 17” x 8” starter slates. None of the above sizes are standard in the domestic market. The clipped corner on field slates measured 3” on each of the legs formed by the right triangle at the bottom corner (Figure 1).

Installation and Repair

Underlayments: Although a double layer of #30 asphalt saturated organic felt underlayment might prove satisfactory for use below slates laid according to the French method, given the tendency of rainwater to penetrate below the slates in wind-driven rains, it would be prudent to upgrade the roof system’s underlayment. Enhanced underlayment options might include a highly permeable self-adhering synthetic, an impermeable synthetic (assuming the potential for condensation on the underside of the deck has been mitigated), or a multi-layered hybrid system.

Starter Course and Cant: Although not generally shown in the details contained in early- to mid-twentieth century manuals and standards, such as that shown in Figure 1, a cant is required at the roof eave to elevate the butt end of the starter course slates and permit proper fit and contact of succeeding courses. As with traditional slating, the cant may be fabricated of wood, synthetic wood, or metal, or made integral with the drip edge at the eave.

The length (long dimension) of the starter slates is sized to match the length of the hypotenuse formed by the upper right triangle of the field slates (Figure 2). The hypotenuses, however, measure 19.80” for the 14 x 14 field slates and 16.97” for the 12 x 12 field slates. In order to prevent the bond lines in the starter course from becoming too close

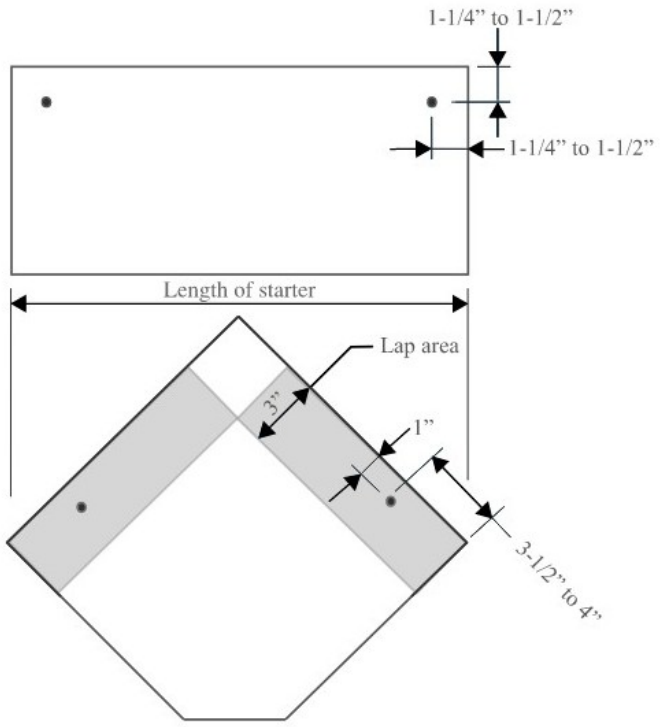


Figure 2: Placement of nail holes for starter course (top) and field slates (bottom) used in the French method of slating. The length of the starter course slate is illustrated as equal to the hypotenuse of the field slate.

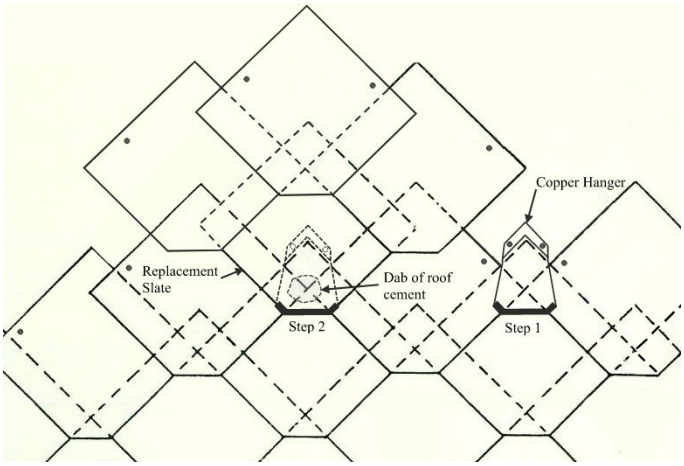
to the sloping edges of the slates in the first course (akin to insufficient offset in traditional slating), the starter slates should be trimmed to length to maintain proper offset.

Nailing: Two slating nails are required for each slate. Nail holes in the starter course slates should be punched approximately 1-1/4" to 1-1/2" inches down from the head of the slate and 1-1/4" to1-1/2" in from each end. Ideally, nail holes in field slates would be punched in the area of triple overlap, but this would place the nails too high up to properly support the slates and guard against wind uplift and displacement. As such, the nail holes should be punched approximately 1" in from the upper sloping edges of the slate and 3-1/2" to 4" up from the lower sloping edges (Figure 2).

Slate Repair: Repair (removal and replacement) of broken slates installed according to the French method is somewhat difficult, largely because there is no true bond line in which to insert a nail and bib, or place a slate hook. Two repair methods are presented below. The first entails fabricating a heavy-gauge copper hanger that will wrap around the butt end of the replacement slate (Figure 3). In this method, the hanger must be mitered and soldered at the changes in direction along its bottom edge to help prevent it from unfolding over time under snow and ice loads. The second method makes use of slate hooks placed at opposing angles each side of the replacement slate (Figure 4). In both methods, the butt end of the replacement slate may be set in a dab of trowel grade roof cement or sealant adhesive to help hold the slate in place and limit clattering in the wind.

Slate Order: Slate shingles are typically ordered by the square, based on a 3" headlap. Since there is no headlap in a roof installed according to the French method, slate shingles are more appropriately ordered by the piece. The number of pieces can be calculated by dividing the total

Figure 3: Copper hanger repair technique for slate installed in accordance with the French method.



roof area to be covered with slate by the exposed area of each shingle or, in the case of an existing building, by counting the number of existing slates and making any adjustments that may be needed (for example, to account for the reduced exposure of the slates in a new roof compared to that of the existing roof). Slates will likely be ordered unpunched as quarries are not typically set up to punch the nail holes where needed in the French method. Nail holes will, thus, have to be punched on the jobsite using a template to help ensure consistency.

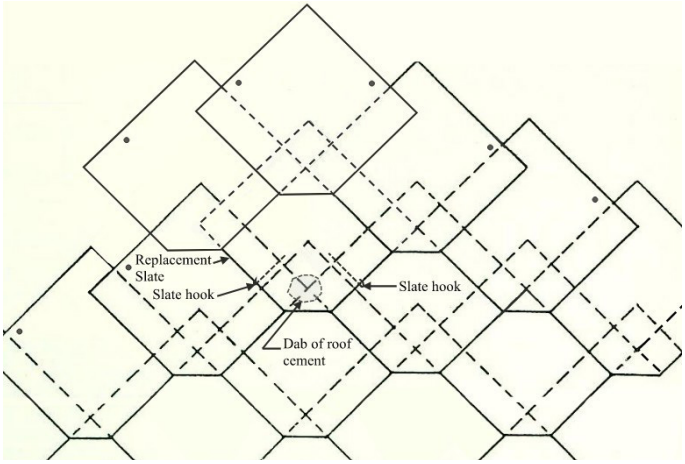


Figure 4: Slate hook repair technique for slate installed in accordance with the French method.

Summary

Like the Dutch Lap slating method, the French method provides an aesthetically pleasing, lighter weight alternative to a traditionally laid slate roof. The French method is, however, prone to leakage during wind-driven rain events. To overcome this problem, a secondary, or supplemental, water-shedding membrane can be installed below the French method shingles. The membrane should have an expected service-life commensurate with that of the slate shingles and have some way of providing a watertight seal around the slating nails. In certain cases, the membrane may also be required to have a high perm rating in order to prevent, or mitigate the potential for, condensation on the underside of the roof deck. In addition, a proper cant at the roof eave, nail locations, lap, and exposure are important detailing considerations that must be carefully thought through and specified to help ensure a successful outcome – a long-lived, durable, and low-maintenance slate roof.

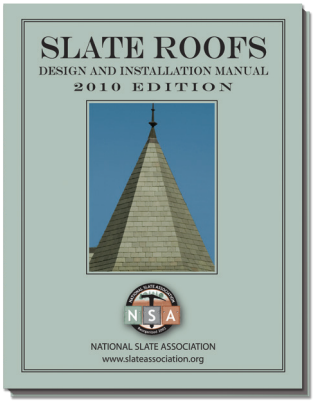
Endnotes

[1]Ramsey, Charles George and Sleeper, Harold Reeve, *Architectural Graphic Standards*. New York: John Wiley & Sons, Inc., 1932, p.64. (Facsimile Edition published 1990 by John Wiley & Sons, Inc.)

[2]*Slate Roofs*. New York, New York: National Slate Association, 1926, p.70.

Lead photo: A stone roof in Norway laid using the French method, with bottom corners of shingles unclipped.

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



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