

BY **JEFFREY S. LEVINE**
Wiss, Janney, Elstner Associates, Inc.

A visual review of the importance of slope for slate roofs.

Never Too Steep: Sometimes Not Steep Enough

Steepness counts when it comes to the longevity of slate roofing. All other things being equal, the steeper the roof slope, the longer the slate shingles will last.¹

Pennsylvania Hard-Vein (Chapman) slate (see related primer) has an expected service life of about one hundred years. This assumes a typical roof slope of between 8:12 (34°) and 14:12 (49°). Put the same slate on a mansard roof with a slope of 25:12 (65°), like the one pictured below (installed c.1895), and the service life shoots up to one hundred twenty years and counting.



The Pennsylvania Black slate on the roof pictured at the top of the next column was installed c.1968. The roof contains a distinct pitch break, demarcated by the arrow. Slate on the upper section of the roof, where the slope is 13:12 (47°), is in decidedly better condition than that on the lower section of the roof, where the slope is just 6:12 (27°).

The final photo illustrates the condition of the slate on the 6:12-slope section of the roof. It is severely delaminated and contains many cracked and broken slates. It should be replaced now (or perhaps five years ago), whereas the slate on the upper section of the roof has a remaining service life of approximately ten years. The slate on the 6:12 slope suffered a reduction in service life of approximately twenty percent.



Location:

WJE Philadelphia
 601 Walnut Street
 Suite 875W
 Philadelphia, PA 19106

Contact:

T: 215.567.0703
 E: jlevine@wje.com

www.wje.com

Steepness (CONTINUED)

The International Building Code (and tradition) allows slate shingles to be installed on roof slopes as low as 4:12 (18°), provided that a four-inch headlap is used. While permitted, it is often not recommended. Slate laid on slopes ranging from 4:12 to 6:12 is not very visible from grade, relies more heavily on the roof underlayment system (which necessarily must be punctured by fasteners), and will not obtain the full expected service life of the slate. Other materials (such as standing seam or batten seam copper, for example) are often a better choice.

Slope matters for several reasons. Snow and ice loads tend to be greater on lower-sloped roofs. The added weight can cause slates to crack. Snow and ice also tends to push and jostle the slates, further increasing the chance of cracking and breakage over time. Perhaps more importantly, the lower the roof slope, the longer it takes for rainwater to drain off completely (i.e., the longer the slates stay wet) and the wider the angle of creep (the tendency of rainwater that enters the keyways between slates to spread fanwise between the overlapping slates). Lastly, the likelihood of foot traffic on lower-sloped roofs is greater, and with greater foot traffic comes the inevitability of greater numbers of broken slates.

¹ Of course, all other things are never really equal. Climate, orientation/exposure of the roof slope, roof drainage patterns, quality of the installation, shading by trees, etc., all impact the service life of slate shingles. But we will leave these issues for another primer.

www.wje.com

WJE | ENGINEERS
ARCHITECTS
MATERIALS SCIENTISTS

Wiss, Janney, Elstner Associates, Inc.

Location:

WJE Philadelphia
601 Walnut Street
Suite 875W
Philadelphia, PA 19106

Contact:

T: 215.567.0703
E: jlevine@wje.com
W: www.wje.com