

Space for energy saving

Chris Thomas FloR, managing director of the Tiled Roofing Consultancy, discusses how to prevent slate deterioration to make a slate roof last longer and thereby reduce energy consumption.

Governments around the world are encouraging us all to design buildings and to specify materials that use less energy in the manufacturing process, distribution, construction, and for the life of the building. Up until now new high-tech materials and systems have overshadowed more traditional building materials, like natural roofing slate, which being very durable, has great potential for energy saving. By studying and understanding the modes of slate deterioration, it is possible to improve the long-term durability of natural slate, making a slate roof last even longer, so reduce the energy consumption of replacement, and extend the lives of our slate quarries.

To understand how, we must start by understanding certain phenomena we commonly see.

Slates trap water

Because slates overlap and touch, water is drawn up between the slates by capillary action when it rains. The smaller the gap, the stronger the force that drives the capillarity.

Long after the rain has stopped you can see the water that has been held between the slates, as when the slates dry out the leading edges are the last parts to stay wet. While exposed surfaces dry in minutes, overlapped surfaces can remain wet for hours.

It is common to see roofs covered with very old natural slates that look acceptable from the ground, but in many cases once the slates are removed the parts of the slates that have not been exposed to the elements are badly delaminated and have lost all of their strength. The relationship between exposure to water and slate decay is clear.

Water activates the various processes that degrade slate. These processes are: acid attack, the oxidation of 'pyrites', the conversion of calcites to gypsum (which undermines the slate's substrate), and freeze-thaw cycling. All of these processes stop once the slate is dry.

The introduction of a small gap between the slates can help control the capillary action, as capillary forces are very sensitive to the size of the gap between the surfaces in question. By holding slates approximately 1.2 mm apart, the water trapped by capillary forces is eliminated, allowing the upper and lower surfaces of the slate to dry out eight times quicker after a rain shower.

Reducing energy use

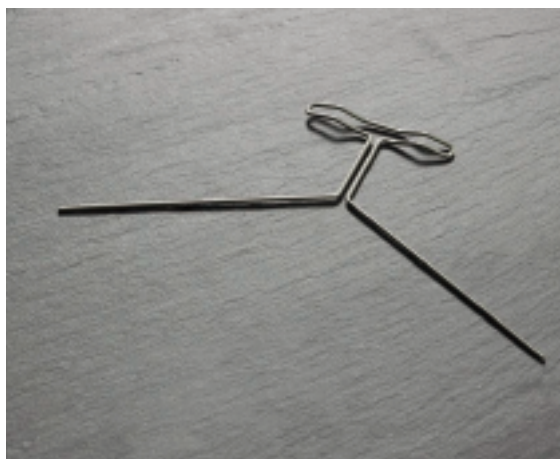
How does gapping slates save energy? It does so by freeing trapped water, letting slates dry quickly, interrupting the aging processes and adding many years to the life of the slate. Longer slate life means less need for replacement slate. Reducing the quantity of new slates needed for re-roofing in turn reduces directly the energy consumed to extract, manufacture and transport many thousands of tons of slates to site (which

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in many cases may be thousands of miles across the world). Also, the energy that is used to supply the slates will be compensated for over a longer period of use, making the energy consumed per year of service life less. In addition to conserving energy, it will also mean that our reserves of good quality natural slate will last longer.



The overlapped upper areas of the Westmorland green slate have become soft and are crumbling, especially around the nail fixing points, which have disintegrated. By contrast, the exposed area of the lower half remains hard and sound, but the underside is flaking, just like the upper portion of the slate.



SlateSpacers are small and simple to install.

Installers and specifiers can now quickly and easily control water between the slates with SlateSpacer. SlateSpacer is designed to maintain the small gap that allows water to drain away quickly, allowing slates to dry quickly. SlateSpacers can be installed quickly and easily during construction with all of the traditional forms of slating. They may be used for new or re-roofing projects; and they are not designed as a retro fit product.

The spacers look like very small wire coat hangers. They are quickly and securely hung between each pair of slates (no fasteners needed) and rest between the slate courses to maintain the 1.2 mm gap. At verges and other roof edges, an alternate form of spacer, also very quick to install, is used. SlateSpacers are universal as they will work with virtually any size and thickness of slate and work equally well with slates that are hook fixed, head or centre nailed.

SlateSpacer offers other benefits apart from making the slates last longer. It makes the slates look better, as the gaps between them are evened out; condensation in the batten cavity is reduced; and damage from under-driven nails is reduced as well, as the spacer, rather than the overlying slate, bears the load of the proud nail head.

All of this can be achieved just by introducing a small gap between the slates.

For more details, see the SlateSpacer web site at www.slatespacer.com