

INFORM

INFORMATION FOR HISTORIC BUILDING OWNERS

Repairing Scottish slate roofs



What is special about a Scottish slate roof?

Many traditional Scottish buildings have roofs that are covered with local slate or stone. The relatively small and thick Scottish slates were produced in a variety of lengths and widths, and laid with the largest slates at the base of the roof, with the smaller ones at the top. This method was introduced for purely economic reasons. It made best use of all the material produced and resulted in the unique roofscapes we enjoy today. Each roof slope bears a fingerprint of the quarry that supplied the material, with the pattern of diminishing courses, and the colour and textures all being highly distinctive. Once these characteristics have been identified it is possible to recognise the same traits in any neighbouring buildings roofed with material from the same source.



Image: © Ingvál Maxwell



Image: © Ingvál Maxwell

Scottish roofs tend to be steep, with slopes of around 40°. Steeper pitches are less prone to the let wind-driven rain or snow into the roof space. Water quickly runs down the slope thereby minimising the potential for it to penetrate the roof space. An additional benefit is that the form of construction offers good headroom in the attic space. If the plan of the building is deep enough, this is frequently used as living space. Features such as dormers, add to the size of these rooms, and skylights providing additional daylight. The variable dimensions of Scottish slate makes it well suited to steeply pitched and intricately shaped roofs. This may well have influenced the development of other characteristic features such as turrets and near vertical roof slopes.



Around 1800, improved woodcutting techniques made the mechanical sawing of timber easier. This offered new and increased opportunities to use thinly cut boards, to cover structural roof timbers. This “sarking” readily allowed the single nail fixing of different sized slates. Sarking also created a number of advantages over the previous practice of hanging slates on timber battens using wooden pegs. It increased structural stability, offered draught proofing and insulation, and improved the resistance to water penetration. The boards were commonly laid horizontally, and sometimes angled where the rafters were widely spaced. Sarking boards were normally fixed with square cut edges but, on occasion, the boards were joined together. After they were laid, square-edged boards sometimes dried out and shrink to leave a “penny gap” between the boards. This

gap accommodated any further movement of the wood and provided an appropriate source of ventilation to keep the timber dry and sound. It was therefore often written as a requirement into the original specification for roofing works.

During the 19th Century slates were also trimmed into scalloped and diamond shapes before fixing. With careful sizing these individual pieces were combined to create intricate architectural patterns across the entire roof surfaces.

When a roof needs to be repaired

Scottish slate has a good reputation as a long-lasting material. Recent research supports this, with many slates showing that they have a service life of 150 years or more. In achieving this, their fixings and support requires repair and maintenance. It is sensible therefore to inspect roofs at regular intervals to spot any potential problems as soon as they appear. This is especially important as slate has not been quarried in Scotland since the 1950s, so supplies of slate for matching repair and replacement are becoming very scarce.

Regular repair is the best way to eke out the currently limited resource of Scottish Slate and ensure that existing roof coverings will remain watertight and continue to perform well.

Inspection

Regular inspections are essential to spot and tackle problems before they become aggravated – and repair costs escalate. Before the onset of winter, inspections and repair work in the autumn are recommended. It is also advisable to repeat the inspection after a particularly severe storm or gale.

Starting with a preliminary viewing from ground level, the use of binoculars will help reveal the roof in more detail. Evidence of any problems, should be recorded and any items of concern listed. This note can then be used as a “prompt” when discussing with or engaging a contractor to carry out any identified repair work. (More information on inspecting property is provided in the free publication, *Maintaining your home: A Short Guide for Homeowners*, available from Historic Scotland).



Image: © Ingal Maxwell

Good Practice

Like all natural materials, some Scottish slates can undergo changes that make them vulnerable to breakage and affect their performance on the roof. The best way to test for this change is to hold a loose single slate at its edge and gently tap it in the centre with a hammer. This should produce a clear ringing sound if the slate is sound. If a dull, dead, sound emanates it is likely that the slate has become porous and is past its usefulness.

Slates may also break on the roof because of:

- wind uplift
- nails being driven in too far hold the slate too firmly against the sarking
- nails not being driven into the sarking far enough and remain with their heads standing proud. This is likely to damage slates in the courses above as the slate will

sit on the nail head and not bear down evenly on the underlying slate.

The best way to establish the number of damaged, missing or slipped slates is to look along the bottom of the slates in a single course. Any slates that are out of alignment are probably loose and likely to require attention. Repeat this process with each course across the roof, keeping a note of the number of affected slates. As a general rule, if more than 20%-25% of the slates are cracked, broken, dislodged or missing, it is likely to be more practicable to strip and re-roof the building than replace only the affected slates.

It is also important to check the internal roof space for evidence of any leaks. These leaks may not always be obvious from an external inspection but they can help reveal where other external problems might be.



Image: © Ingval Maxwell



Image: © Ingval Maxwell



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Reslating

If major reslating work is required, it is advisable to contact the local planning authority to check if planning permission or listed building consent might also be needed. In the light of the difficulties in sourcing large quantities of Scottish slate, the existing roof covering should be recorded in detail prior to dismantling.

Great care should also be taken in removing the existing slate from the roof to minimise breakage and allow for their reuse. If a large quantity of new slate is required the decision on what is the appropriate material to use for re-roofing should be made in conjunction with the local planning authority.

Slate sizes

Water penetration can occur if slates have been incorrectly selected and laid. For example, larger slates are required at the bottom of the roof where more water flows over them. They are also required for shallower roof slopes where the water runs off more slowly, and is more likely to seep through joints. Wider slates are also required at roof junctions and intersections so that they can be more appropriately secured.

Impact damage

Access may be required onto the roof to undertake other work, or to repair damaged gutters, rooflights or chimneys. When this occurs, there is a risk that slates will also be broken. Roof ladders or properly protected scaffolding should be used to reduce the risk of standing directly on the slates and breaking them.

Nail sickness

Slates were often fixed using iron or poor quality galvanised nails. Whilst it is rare for all the nail fixings across an entire roof to reach the end of their service life simultaneously, progressive deterioration of the nails can lead to numerous slates becoming loose and slipping out of place. This may also be caused by decay of the slate around the nail hole or decay of the sarking, in such circumstances a complete stripping and reslating will be required. In carrying out the stripping work care should be taken to retain as many of the original sound slates as possible. These can often be resized and reused.



Image: © Ingval Maxwell

What is involved in repairing a Scottish slate roof?

Scottish slates are traditionally held in place on the sarking by a single nail fixed through a hole at the slate head. This is sufficient to hold it in place, and resist wind uplift. Provided the proper overlaps are observed, there is also less chance of water penetrating through the nail hole.

With each single-nailed slate also trimmed at the shoulders it is possible for individual slates to be easily swung aside to allow access to carefully remove the broken slate and for a replacement to be nailed in its place. The overlapping slates can then be swung back into their original positions over the new slate to keep the roof watertight.

Regular maintenance of a slate roof should be relatively inexpensive, with the occasional replacement of a handful of slates being all that is necessary. It is important to select any replacements carefully. Attention should be paid to their size, texture, thickness, weight and colour. If it is not possible to precisely match the existing slates, a slightly lighter colour for the replacement should be chosen rather than a darker hue as this will help it to blend in better.



Image: © Neil Grieve

Selection of contractor

Not all roofing contractors are familiar with local slating traditions especially if their workers originate from outwith the area. It is therefore preferable to use a local contractor experienced in local techniques. To check that a contractor has the right background, photographs of previous work they have carried out could be requested. Better still, if it is possible to visit previous work their competence can also be assessed more accurately – provided they still have the same work force.

Inspection of a roofer's work should check that:-

- slates are laid evenly and sit well across the roof
- courses diminish regularly from eaves to ridge.
- margins are either the same size or smaller than those below.

Contact details for slating contractors working in Scotland are available from the Historic Scotland Conservation Bureau.



Image: © Ingval Maxwell

Further reading and information

Maintaining your home A Short Guide for Homeowners
2003, ISBN 1 9035 70 93 X

Scottish Slate Quarries Technical Advice Note 21
2000, ISBN 1 9035 70 04 2

The Pattern of Scottish Roofing Research Report
2000, ISBN 1 9035 70 09 3

Slaterwork Conservation Manual 9
1999, Glasgow West Conservation Trust

Stone slate roofing Technical Advice Note
1998, English Heritage

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