

# INFORM

INFORMATION FOR HISTORIC BUILDING OWNERS

## Pantiles Maintaining a Pantiled Roof



## **Introduction:**

Despite the profile of Scottish roofing being dominated by a variety of types of slate, a significant number of traditional buildings are also roofed with pantiles. A pantile is a single-lap, fired clay tile which is broadly S shaped in appearance. Single lap means the end of a tile only laps the course immediately below, as opposed to plain tiles which lap two courses. Pantiles are most commonly found in areas of the country where the weather is less severe such as East central Scotland, the Lothian's and Fife although examples do exist elsewhere. This INFORM provides information relating to the history of the use of pantiles in Scotland, the tiles themselves, and guidance on the proper care and maintenance of pantiled roofs.

## **History of pantiles in Scotland**

Pantiles were first adopted in Scotland in the early 17th century and a number of examples still exist from this time. It seems likely that the earliest use resulted from imports from the continent, most notably Holland. Use of pantiles spread inwards from the East Coast ports where the imported stock would originally have arrived. By the 18th century Scotland had developed its own indigenous pantile industry, and the material began to be more widely used. The related development of the drain tile and brick industry saw a steady increase in production as native clay was more widely extracted and utilised. Modern pantiles are still in use today although these are now generally produced to more precise patterns in factories in England.

A pantile was made from burnt clay in similar fashion to a house brick. Traditionally both were made by the same manufacturers for general use in the area local to their production.

This resulted in a great deal of regional variation in both colour and overall size. The colour inevitably reflected the local clay and although orange-red is most common, blue-grey or black can occasionally be found. As the tiles were hand made considerable differences in size and shape also exist, although the profile used was always a double roll (S shape).

## **Construction of a pantile roof**

A pantiled roof has a series of regularly spaced horizontal battens attached to the rafters on which the tiles are hung. The tiles have a projecting nib on the back. This small projection on the rear of the tile holds it in position when laid on the batten. The battens needed to be spaced evenly to ensure the tiles maintained the appropriate lap over their underlying neighbour.

Pantiles are laid so that the downturn of one overlaps the upturn of the next on the same

course. This forms a system of ridges and troughs which concentrates rainwater into the centre of the pan. Rainfall on the flanks of each tile is also deflected away from the side rolls and into the centre. Over a series of courses this system channels the water down the roof slope. Due to the need for such a system to operate efficiently, tiles of similar width must be laid in columns on a roof. This is an important consideration when considering re tiling a roof that sources tiles from a variety of different locations.

The ridge of a pantile roof is normally also protected by clay ridge tiles. These can either be half-round or 'V' shaped, depending on local availability. Ridge tiles are almost always bedded in lime mortar. This provides extra security to the fixing and added protection from the weather by preventing wind uplift. At the masonry skewers (the top of the gable end) a mortar fillet was also applied to prevent water penetration.



*An exposed roof showing battens onto which pantiles are hung by their nibs*

In re-tiling and repair work lime mortar should be employed, rather than cement. Cement mortar will make it harder to repair a pantile roof in the future, and can have an adverse effect on the softer tiles due to its hardness. In contrast, lime mortar is breathable, allowing moisture to evaporate without damaging the tiles. It is also slightly flexible and can be more easily removed from tiles if repair work is necessary.

It is uncommon to find fitted rainwater goods as part of a completely pantiled roof. Pantiled roofs would sometimes be bellcast (a slight flattening of the roof near the eaves) This was created in some cases by the bottom 3-5 courses of the roof being slated, known as easing courses. Using slate at the bottom of the roof also gave better protection from the rain at the shallower pitch over the wall head and helped to prevent the lower tiled courses from being uplifted by the wind. In other circumstances for the same

reasons the lowest courses of tiles were often bedded in lime mortar in a similar fashion to ridge tiles. This provided greater strength by holding the tile more securely in position and offered extra protection against wind and water ingress.

Pantiles were also sometimes parged. This is where the underside of the tiles was filled with mortar between the roof battens. Some roofs were formed by bedding the pantiles in mortar directly onto sarking boards but this is more unusual due to the tile nibs projecting on the back. The use of parging was a local variable. Its adoption depended in many cases on local weather and exposure conditions. Where pantiles were bedded in mortar, tilers were always careful to ensure that the mortar remained clear of any direct rain water run-off. This prevented dampness and frost from eroding it.

## **Problems with Pantiled roofs**

As with all elements which make up a traditional building, there are a number of issues which can arise with pantiled roofs. The most common of these are:

- Loose or broken tiles
- Deterioration of the tiles
- Deterioration of battens and fixings
- Failure of mortar bedding or parging

## **Repair and Maintenance**

If regularly maintained, a pantiled roof will remain sound for many decades but the roofs need to be regularly inspected to identify any problems which are emerging and ensure these are addressed at an early stage. The most common defect is loose or broken tiles. Tiles can become more porous with age and in some cases to break apart. Where evidence of any of these problems is apparent, careful localised patching of the tiled roof will be necessary, taking care not to damage other tiles during the work.

Where practical, the original tiles should be retained. This will help keep the character of the building and is a more economic option than replacing the entire roof cover. When

re-using pantiles it is important to ensure any moss is removed from their surface as this can promote dampness and hasten deterioration. The easiest way to remove moss is by the gentle use of a bristle brush. The use of chemicals should be avoided as this may damage the tiles.

Where patching is required, the pantiles should match the dimension, colour and shape of the originals as closely as possible. This allows the replacement tile to link properly with the existing roof covering and also helps retain the visual appearance of the roof. When using second-hand pantiles they should be carefully checked to ensure they are compatible with the existing. If second hand tiles are not readily available, new pantiles



*Replacement pantiles located in an unobtrusive area of the roof*

are still manufactured and may have to be used. Most of these are machine made but this produces regular sizes, shapes and colours which will make the replacements stand out from those already on the roof. When introducing new tiles to an existing roof it is better to try and place these in unobtrusive areas to avoid the visual impact of new against old and by relocating the existing tiles to the more conspicuous areas of the roof.

It is important when repairing a pantile roof to use replacement tiles that have the same double-roll profile. If this is not the case the tiles will not fit together properly, and will allow rain water to penetrate the roof structure. There is also a greater likelihood of loss of tiles in adverse weather through the wind lifting them if the wrong profile shape is used and gaps between the different shapes remain.

When making alterations it is important to ensure that all tiles are securely fixed. This ensures the safety of passers-by and the performance of the roof. Concrete replacement tiles should not be used where a roof was originally pantiled. These are often heavier and thicker than traditional clay tiles and the roof structure may have to be strengthened to support this extra weight. Concrete tiles do not weather or age in the same manner as clay, becomes porous more quickly and have a more limited life expectancy on the roof.

Movement in the structure of the roof can lead to the deterioration of battens and fixings. This can dislodge the alignment of the tiles and make the roof vulnerable to water penetration. Where this is a problem the roof structure should be fully inspected to establish, and rectify, the cause. Filling the open junctions between the tiles with lime





mortar can help stabilise loose tiles and keep them in place. The use of foam or bituminous-type treatments on the internal and external tile surfaces is not advised. These applications make it hard to re-use tiles in the future and can, by reducing ventilation, also hasten timber decay.

Structural problems make this pantiled roof vulnerable to further deterioration

Where a roof has been “torched” underneath with lime mortar this can sometimes fail. When this happens it can lead to loose tiles, draughts and water penetration. A similar lime mortar to the original should be used when replacing deteriorated sections. The use of cement mortar for this purpose could lead to condensation and deterioration of existing tiles and should be avoided.

Due to the method of construction, pantile roofs allow more air to enter a roof structure than a slated roof or a modern equivalent. To overcome this and improve the thermal efficiency of the building an insulated ceiling may be constructed taking care to avoid the risk of creating condensation. Adequate ventilation must also be allowed when insulation is being introduced and specialist advice should be sought before an appropriate strategy for increasing the level of insulation is arrived at. It may also be necessary to consult with the local authority on any related building control issues and to establish whether listed building consent is necessary for the work.



## Further reading / contacts

Historic Scotland Research Report:  
*The Pattern of Scottish Roofing*

Historic Scotland Guide for Practitioners 1,  
*Rural Buildings of the Lothian's*

*The Repair of Historic Buildings in Scotland*  
Historic Scotland, 1995, ISBN 0 9517989 2 8

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