



Varied tiled rooflines, Buckler's Hard

Historic buildings Tile and Slate roofing

This leaflet describes the character and appearance of clay tiles and slate traditionally used on roofs in the area, as well as some of the problems encountered. It also includes suggestions on appropriate methods and materials for use in repair.

There is a list of references and useful contacts on the last page.

Introduction

For a long time buildings have been covered in clay tile or slate. Throughout the Forest there are examples of tile and slate roofs on buildings ranging from granaries and sheds, to Jacobean mansions.



Tiling in progress

History and description

Clay tile

Clay roofing tiles have been used in England for many hundreds of years. However, in the last 100 years locally produced, hand made tiles have ceased to be made. Traditionally the tiles were simple flat or gently cambered rectangular units, the subtle differences in shape and camber caused by the firing process. Those with a slight camber or bend assist in throwing off water and the gap created under each tile means that capillary action cannot drive rainwater up and under the tiles.

They are usually fixed using nails or pegs: two holes are made at one end in the wet clay. Once fired they are nailed into roofing battens, or, if wooden pegs are used, they are hooked over the top edge of the batten. In some instances, clay tiles are also used to clad a wall, either for aesthetic purposes or to prevent ingress of rainwater. In such cases the tiles are usually fixed with nails into battens.

These tiles are generally known as 'peg' tiles. They were manufactured

across the Forest, and even today there are reminders in the names of buildings. An example is 'Tile Farm Barn'. When a brick building was constructed and roofed in clay tile, the clay for both brick and tile was usually dug in the near vicinity of the property. Indeed, tiles were required to be burnt alongside bricks because the bricks in the kiln served to prevent the tiles from over burning by absorbing some of the heat. Road names that signify this historic industry include: 'Brick Kiln Lane' and 'Brickmakers Road'. There was plenty of good quality clay around and as such transport costs were reduced dramatically.

Hand made 'nibbed' tiles were also manufactured, but there are far fewer remaining in the Forest. When the clay was wet, the tiles were pinched at one end to create two thumb-sized nibs, which served as hooks on which to hang the tiles. Depending on the severity of the exposure of the roof and the angle of the slope, nibbed tiles may be nailed on every third or fifth course.





◀ Example of colour ranges within tiles and decorative finial



▶ Slate roof

The colour of most roof tiles in the Forest ranges from a deep orange to a dark red, similar to the bricks that have been used to build many of the old houses.

During the Victorian era mechanisation of tile manufacture began. These tiles appear more uniform in shape, they are sometimes darker in colour and impart a less vernacular character to roofs. Local tradition continued to some extent, but the coming of the railways at a similar time meant that tiles made in one part of the country were used in another part.

Slate

All slate is metamorphic rock. That is, it has been altered from its original form by pressure or intense heat. The rocks from which slate is quarried were all created during mountain-forming periods, hundreds of millions of years ago and now form the range of building slates of the British Isles.

Roofing slate has been common in slate producing areas since the very early 18th century. There are four distinct areas across England and Wales: the Lake District, which produces a blue-grey slate; mid Wales, where slates are grey; north-western Wales, where a blue or occasionally plum red slate is quarried; and from Cornwall which produces a grey-green slate known as Delabole.

In the New Forest slate was possibly used in small quantities for important buildings such as churches, during the mediaeval period, when it might have been shipped from Cornwall. However, it was introduced on a major scale when the railways were constructed in the mid-19th century. Prior to this the cost of transporting large quantities, either by boat or by horse and cart, was prohibitively expensive - and given the easy availability of clay and thatching straw it was unnecessary.

There are many historic buildings across the Forest which have slate

roofs. Some were built with such roofs, while others, which are from the period prior to the coming of the railways, were originally either tiled or even thatched.

During the early to mid 19th century, slate was used extensively, sometimes in an attempt to elevate the property and the owners, into a higher social class.

Slates are produced in various sizes, and are fixed with either pegs or nails in a similar fashion to clay peg tiles. They are also used to clad walls. The holes in the slate were knocked into the back (known as the bed,) using a pointed hammer sometimes called a 'zax'.



Small holes such as these can let a lot of rainwater in



The usual results of faulty roof coverings

Maintenance

Roof coverings are exposed to the worst of the elements, including heavy and prolonged rain, occasional severe freezing/thawing cycles, direct sunlight and strong winds that create positive or negative wind loads on the roof. All of this can seriously and detrimentally affect the integrity of roof coverings.

Regular maintenance of a roof is important to ensure that problems that develop are contained before more serious issues arise. A small hole in a roof covering may appear innocuous enough from ground level, but it might be large enough to channel sufficient water into the roof to create rot and ruin ceilings, wall coverings, paintings and furniture.

Inspection of the roof, in particular of the firmness of the fixings and the rigidity of the covering, should be carried out on a regular basis. Allied to this should be an inspection of rainwater goods, which, if left unattended, can also be the cause of water damage to structure and fabric.

Problems

Cracking

Tile and slate can both crack, due to severe weather as well as natural deterioration.

Cracks in tiles usually occur due to imperfect firing of the clay tile in the kiln. Hairline cracks, formed during the firing process, can be exploited by vegetation and rainwater. In all cases, the expansion of the crack causes a weakening of the tile, which in time can fall apart. Such cracking might occur across the width or the depth of the tile. In each case the pattern of cracking might appear different, and the durability of the tile may vary.

Cracking around the nail or peg holes also occurs. A natural weakness, the expansion of rusting iron nails or even swelling wooden pegs can exacerbate any imperfection, such as ragged holes.

Other imperfections which can cause problems include areas of tile which are subtly different in their makeup, and either fire harder or softer than the remainder of the batch. Occasionally too, there may be small stones in the tile which expand and crack when fired. In instances where such imperfections have been overlooked in the production process, cracking and deterioration will occur once fixed to a roof.

Freezing weather following rain increases the volume of the water within the roof covering (because water expands upon freezing). Freezing, in time, may cause cracking.



Slumping roofs such as this indicate serious underlying problems



Small hand split battens which have cracked and failed under load

De-lamination

De-lamination of the underside of the covering is characteristic of slate that has deteriorated through water ingress. The geology of the material means that it is made up of lots of layers, which can in time separate through water ingress. This can be a particular problem because in time the de-lamination can become so severe that the slate is no longer effective at preventing rainwater getting into the structure.

Clay tile is also affected by a similarly destructive process, but because it is man-made and not natural, it crumbles rather than de-laminates. This kind of deterioration is caused either by the freezing / thawing cycles of rainwater which has been drawn up the underside of the covering, over many years, or by the salts in rainwater which have effectively broken down the material.

Capillary action also occurs along the joints of tiles and slates and is then drawn to the under side of the covering and into the fabric. Again, over a period of time cracking of the edges of the covering can occur. Only during repair work may such damage to the covering be discovered.

Nail sickness

This is the term applied to nails that are so severely rusted that they can no longer perform their task properly. Years of condensation or rainwater ingress affect the integrity of the iron nails, which can finally fail. On a roof with an acute problem, the entire covering can slump.

Failed battens

Sometimes, particularly on roofs from the Georgian period or earlier, battens are undersized in relation to the amount of load they are required to carry. Before the common use of machine sawn battens, most were split by hand. The result is sometimes an uneven, varied product that may have survived only in part, for several hundred years. The dimensions of a batten are sometimes so small that even the original nail caused it to split. In time, during successive re-covering the battens may have split further, allowing large areas of roof to fail.

Ridges, valleys and hips

Details of how a roof is dressed in these areas vary. On slate roofs, lead is traditionally used in all three areas, but on hips and ridges clay tiles are also commonly found.

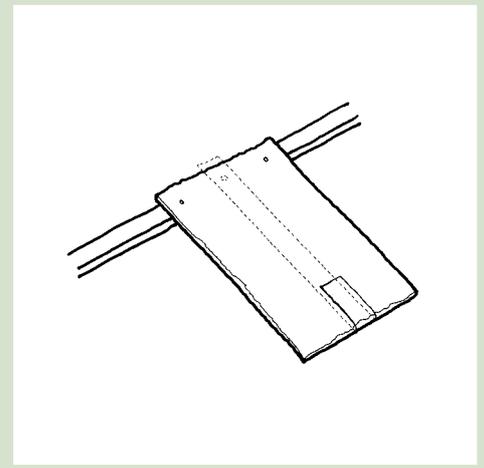
On clay tile roofs ridges are almost always made of clay. 'Hogsback' and 'half round' tiles are common varieties. Hips are either created using hogsbacks or half rounds, but 'bonnets' were also made. Valleys are either created using lead, or special valley tiles.

Poor detailing of these areas can lead to severe damage not only to the covering itself, but also to the interior of the structure. It may be necessary to investigate alternative detailing options where problems occur.

Lack of maintenance can also be a problem, particularly on flat lead valleys, where a build up of detritus can occur. This can lead to the subsequent build up of rainwater and the eventual over spilling of water into the roof void.



Quality of battens should be assessed before re-roofing



A tingle on a slate

Repairs

Listed buildings

Works of repair using materials on a strictly like-for-like basis, do not require listed building consent. However, if it is proposed that a large proportion, or even the whole roof covering be stripped and replaced, then the homeowner or builder must contact the Planning Authority prior to beginning the work to ascertain whether consent will be necessary. Extensive works of repair may affect the character and a listed building consent application may need to be submitted to, and approved by, the Planning Authority prior to any works taking place.

In most cases where works to a roof covering are required, removal and refixing the original covering will take place. The extent of other works will be ascertained from a detailed inspection. Any deficit of roof covering will need to be made up with an appropriate replacement.

After all, treating the symptoms, such as replacing slipped slates, has little impact upon curing an underlying problem. If battens are failing, nailing in new slates will do little to rectify deterioration of the batten.

Nails and pegs

Failing nails should be carefully removed and replaced with either galvanised steel or copper. Large diameter heads effectively restrain slates from movement. Wooden pegs that have perished should be replaced with dried oak pegs of similar section and length.

Battens

If wholesale replacement is required, the quality of the battens should be assessed in the context of the roof they sit on. Clearly, very old battens on a fine, relatively untouched roof add positively to the historic interest of the structure, and therefore any replacement should accurately reflect the form of the originals. This will in many instances mean using cleft oak battens. However, should the need to replace the original battens have been generated by undersized old battens, then more robust cleft battens are acceptable.

On roofs of less historic and architectural quality or merit, the use of modern treated softwood battens is acceptable.

The relative merits of a roof must be judged by the Planning Authority in the case of a listed building, in order to decide whether listed building consent is required prior to any replacement taking place.

Patch repair

Slipped slates can be removed and re-positioned using 'tingles'. These long metal strips, usually made from lead or zinc, are nailed to the same batten as the failed slate, but are sufficiently long to hook under the re-positioned slate, in order to hold it in place.

This is a temporary repair and should be treated as such. When more than a few slates have been replaced in this fashion, one must consider the reason for the failure, and take steps to prevent more slippage before the entire roof fails.

Nibbed or nailed tiles can be replaced simply. Lifting surrounding tiles and gently easing a new tile onto the batten is all that is required. The weight of the surrounding tiles holds down the replacement firmly.



Where the structure of this barn roof can be seen from below, the insertion of an underlay would detrimentally affect the character

Felt underlay

It is perfectly acceptable in most dwellings to install an underlay before re-covering the roof, especially if re-battening with modern tanalised timbers. Roofing felt, or one of the modern generation of breathable underlays, such as 'Tyvek' or 'Monoflex' may be used.

However, in roofs of special quality, or those rare examples which are exposed to view, as well as barns, outbuildings and some porches where the roof structure can be seen from below, the insertion of an underlay would detrimentally affect the character of the space, and should therefore be avoided.

NOTE: A 'quick fix' solution to roof problems involves the use of sprayed foam sealant, applied to the underside of the roof. The waterproofing ability of such foams, as extolled in sales brochures, is well known - but they effectively suffocate roof timbers.

Any rainwater that manages to permeate the slate will work its way into the roof structure. As foam is non-breathable, constant dampness will in time lead to wet rot, and potentially, dry rot. This damage goes unnoticed, and in time could cost a lot of money to rectify. The roof structure is damaged visually by foams and they are very difficult if not impossible to remove from the back of slates and tiles. On no account should these products be used on listed buildings.



Inappropriate use of foam sealant



This barn roof is in poor condition allowing water to penetrate. In this case the slate should be removed, the timber repaired and the slate re-used where possible



The rebuilt roof used closely matching Welsh slate with clay ridges, as previously

Complete stripping and recovering

In very few instances will complete replacement of a roof covering be necessary. It will nearly always be possible to salvage and reuse a percentage of the tiles or slates.

Special details or patterns in the slates such as fish scale courses, or diaper patterns in tiles, must be carefully noted and photographed, prior to removal of the covering.

If, on close examination, it is found that some of the original covering is in too poor a condition for re-use, then the shortfall should be made up of a matching material, in terms of texture, size and colour.

Second-hand material can be used in small-scale works, or where patches are required to be replaced. On stripping the roof, an inner slope might readily be replaced with new slate or tile, whilst the outer slope be repaired using original material. If larger scale replacement is necessary, then the use of new tiles or slates may need to be considered. In either case, blending existing material with new can avoid creating uncharacteristic, visually-obtrusive areas on a roof.

New slate should be of the same texture, size and colour as the original. Ideally the material should be quarried from the same region, but it is not an imperative. As an example, in geological terms,

Canadian and Welsh slate is very similar, because it was formed during the same period and can therefore be a very good match.

Clay tile replacements must be of the same texture, colour, size and depth as the original. In addition to this, the shape of the tile is important. Some tiles are curved in two directions - across their width and along their length - whilst others are only curved in one direction. New tiles should match these characteristics closely.

In most instances, changing a roof covering from one material to another, will not be appropriate. In the case of listed buildings such changes are unlikely to be granted listed building consent.

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Click on the website
address for link



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by **Wright, A** Batsford

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