

RECOMMENDATIONS FOR LAYING AND FIXING PEG TILES

1. DEFINITION AND DESCRIPTION

Plain clay roofing tiles laid to a double lap have been used for roof covering in England since before the Norman Conquest and tiles dating back to Roman Times have been discovered under excavation. Evidence of their early use is to be found throughout England with the exception of the south-west peninsular and the north (Lancashire, Cumbria, Northumbria). From the outset clay plain tiles were made incorporating fixing features. Most of the early tiles made in the Midlands and related areas were made with a single nib for hooking to laths. Early tiles made in the southern and eastern counties were more regularly provided with two large holes through which pegs for hooking could be secured. It is this latter variety, commonly known as 'Peg Tiles', with which we are concerned.

2. TYPES OF TILE

2.1 Peg tiles retain their popularity from earlier times until Victorian times due to the simplicity with which they have been made and burnt when compared with the more complicated manufacture of nib tiles. However, old peg tiles have retained their popularity for aesthetic reasons due to subtle variations which are not repeated by modern manufacturing methods.

2.2 Clay plain tiles are manufactured in three basic ways: firstly by hand-making, secondly by hand-finishing (or hand-crafting) and thirdly by machine-making.

2.2.1 'Hand-made' tiles are made from clay prepared in the mass from which a piece is cut by hand and pressed into a simple mould and cut off, with nibs formed and nail or peg holes formed by hand with simple tools.

2.2.2 'Hand-finished' or 'crafted' tiles are made from clay prepared in the mass by machine and extruded in the form of tile 'batts'. These are rectangular plates of clay from which the tile can be pressed by hand into a simple mould and cut off, and completed by hand in the method described in **2.2.1** above.

2.2.3 'Machine-made' tiles are prepared without handwork by a variety of methods but would not normally be considered to be 'Peg Tiles'.

2.2.4 This document does not include for nibless clay tiles which are manufactured for nailing to battens in accordance with BS 5534 Code of Practice for Slating and Tiling.

2.3 Peg Tiles will normally be, and in the past have been, produced by either the hand-made or (latterly) the hand-finished process.

3. PEG HOLES

3.1 Peg tiles are normally provided with two holes at the head of the tile, one on either side of the vertical centre-line of the tile where the joint of the upper two tiles occurs when laid. These holes are formed by simply poking through the tile with a suitable slightly tapered device in such a way as to avoid splitting the unburnt clay. Any crack about these holes before or after firing would be unacceptable.

3.2 As originally devised, the peg holes should be roughly rectangular, although circular peg holes are common in later tiles. The holes would be approximately 8mm wide although variations to 15mm wide are not uncommon, varying even within a district of origin. The tapered device facilitates withdrawal from the clay when the hole is made. The tapered hole is provided to allow a wooden peg to suitably wedge into position. A roughly prepared wooden peg is also more secure in a rectangular hole. Often aluminium pegs are now used instead of wooden pegs.

4. SIZES

4.1 Historically, each locality where peg tiles have been traditionally made and used will have its own size of tile, probably determined by the type of clay used and the incidence of loss due to firing. These tiles were made at local brick and tile yards, often on country estates.

4.2 Some consistency of size can be identified:

- Kent peg tiles are usually 9.5 inches (240mm) in length.
- Sussex peg tiles are more likely to be 10 inches (250mm) in length.
- Others, in Surrey for instance, were 11 inches long but could be as long as 11.5 inches (290mm).

- Around York peg tiles can be as large as 12 inches x 8 inches (300mm x 200mm).

Peg tiles in various sizes will also be found in Cambridgeshire and East Anglia and in parts of Lincolnshire, Yorkshire, Dorset and the southern counties.

5. ROOF PITCHES AND HEADLAPS

5.1 Peg tiles were generally used on steep roof pitches at around 50 degrees. Roofs at this pitch would have required torching with mortar from the under-side, particularly where the roof space needed to be draughtproof. This requirement varied from area to area according to local conditions. Mortar torching provides a great deal of supplementary fixing where necessary.

5.2 Peg tiling should be specified by the lap required and not by the gauge. For pitched roofs of 45 degrees and above, a 60mm to 65mm headlap is normally sufficient. The lengths of peg tiles may vary slightly, so it is usual to see some variation in the courses. However, this should not compromise the integrity of the roof, providing the correct gauge is used. For roof pitches less than 45 degrees, the minimum headlap may need to be increased.

5.3 On very steep pitches, oast houses for example, tiles would normally be hooked on pegs, bedded and torched over chestnut lathes or battens. Traditionally, tiles would have been fully torched with lime sand hair mortar. In oast houses this torching would amount to internal rendering and would assist the drying process for which the buildings are or were used.

NOTES:

- In some circumstances, combined partial bedding in the headlaps may also have been used. However, under these circumstances pegs cannot be solely relied upon due to the effects of negative wind pressure which has led to more nailing over the years, and the most common method now is to double-batten the roof and twice nail each tile, with the heads of the tiles bedded.
- Special oast house tiles were produced with a taper and to various widths to facilitate use with plain tiles in curved work. The number of tapered widths provided would normally be three, often with only one nail hole centrally.

6. FITTINGS

6.1 Individual valley tiles and hogback (rounded top with flat wings) ridge tiles were made for use with peg tiles from the earliest times. In some areas stone ridges were formerly used.

6.2 Prior to the late eighteenth century, hips were covered with lead sheet for security from wind. Individual round pattern (or bonnet) hip tiles were introduced at this time in the south-east (the Weald) and north-midlands (Broseley), being fixed to the hip rafter with iron nails. Hooking hip tiles with pegs would not have been secure.

6.3 Extra wide tiles could not normally be made and gables were usually formed using single tiles split on site by the tiler. Since the introduction of bonnet hip tiles they have been used on most older roofs at the time of re-tiling or as a repair improvement. Angle and half-round ridge tiles are a more recent introduction and extra wide or gable (tile and a half) tiles were not introduced until the beginning of the present century.

7. PEGS

7.1 Pegs for peg tiles were usually of hardwood, often of oak and sometimes chestnut was preferred, being more resilient.

7.2 Wooden pegs have to be dry before being driven into the tile. As the peg absorbs moisture back to normal atmosphere, the peg swells in the peg hole to become secure. The peg would be driven or trimmed close to the outer face of the tile and left protruding approximately 20mm on the underside as a hook.

7.3 Normally only one peg would be used per tile. It would be unlikely that a second peg would touch the batten in laying due to the variable position of peg holes. Peg holes would be used so that the peg missed the rafter. The peg would extend well past the thin split lath allowing movement of the tiles as the roof tiling settled.

7.4 Tile pegs (or pins as they were sometimes called) were made, as were split laths, as a cottage industry. They were cleft with a chopper or cleaving tool similar to a hacking knife. Pegs are not generally available and special arrangements for their production will normally have to be made.

7.5 Some building heritage groups may be able to assist in the procurement of suitable tile pegs. A sample tile to define the size of hole should be made available to the producer of the pegs.

7.6 Changes in the first half of the 19th century led to the use of sawn battens and various types of metal pegs which resemble blunt thick nails of aluminium alloy or copper wire with large heads.

7.7 Victorian cast iron pegs have caused damage to peg tiles in that they have corroded, expanded and broken off the heads of the

tiles. Early sawn battens were of similar dimension to the previous split laths.

8. LATHS

Laths for peg tiles were prepared by splitting from chestnut timber into lathes 30-40mm wide and 7-10mm thick and supplied in bundles nail tiles 10 split laths. The lathes were fixed to the rafter with wrought iron nails. Split lathes may still be required for some curved or historic roofs but otherwise 38 x 25mm battens conforming to **BS 5534** should be used unless specified.

9. RECENT DEVELOPMENTS

9.1 Machine-made (pressed) nib tiles dominated the market, due to mass-production, towards the end of the 19th century and peg tiles became less popular being more expensive to lay.

9.2 Over the years, an underlay (initially reinforced bituminous felt, now more commonly a modern vapour permeable membrane) was installed to replace torching in most specifications. If split lathes are used in conjunction with roofing felt/ breathable membrane then a counter batten will be required.

9.3 Modern batten sizes now make it possible to nail tiles. Present day tilers have more experience with nib tiles than with peg tiles and a degree of confusion has arisen as to how a specification for peg tiling should be drawn up.

10. RESTORATION SPECIFICATION (COMPREHENSIVE)

10.1 Where true peg tiles are to be used or re-used it is necessary to decide whether the appearance of the under-side of the roof is important. The external appearance of a tiled roof will not normally betray whether the tiles are pegged or nibbed. The specification will therefore be based on the efficiency of the finished roof and the economic use of the materials available. Where it is so deemed necessary to use a traditional specification the following example would be appropriate:

EXAMPLE:

Peg tiles, *, laid to 60mm lap with secure * (wooden) pegs, one per tile, hooked to split * (hardwood) laths nailed to rafters with a 3.35mm gauge round head galvanised steel wire nails.

* = Specify type (for lath size see 8.0 above).

NOTE: Supplementary fixing may be obtained by specifying that the tiles should be torched with lime sand hair mortar.

10.2 Sand lime hair mortar torching, when correctly applied, will also act as bedding at the head of the tile. Where specified, a suitable vapour permeable membrane may be used in place of the torching.

10.3 Alternative supplementary fixing: Peg tiles should be nailed to rafters where peg holes coincide using 3.35mm diameter clout head copper wire nails.

NOTES:

- Where peg tiles have very large holes it may be necessary to specify 'extra large clouthead' 3.35mm diameter wire nails for this purpose. In some districts normal clout head nails are used with 15mm to 20mm washers for extra large peg holes. The length of nail would best be approximately made up as follows: thickness of tile plus thickness of lath plus 20mm, or nearest standard length.
- The above methods of nailing are preferable to machine-drilling or grooving of clay tiles where the shock to the case hardening is disadvantageous and should be avoided, particularly where the original tiles have already been exposed to years of weathering.

11. RESTORATION SPECIFICATION (EXTERNAL APPEARANCE ONLY)

11.1 EXAMPLE:

Existing peg tiles to be laid to 65mm headlap, hooked with 4.5mm (or 5.0mm) diameter x 30mm (or 40mm) long aluminium round point tile pegs, one per tile, to 38 x 19mm (or 25mm) treated sawn softwood battens and an appropriate underlay.

NOTE: Supplementary fixing may be obtained as given in 11.3 above (not torching) or as follows. Each tile in every fourth (or fifth) course shall be twice skew nailed through the peg hole into the top of the tile batten using 30mm or 40mm long x 2.65mm diameter clout head copper wire nails.

11.1.1 The nail head, when skew driven, should occupy the peg hole without pulling right through. In case of difficulty the diameter of the nail should be adjusted remembering that a clout head is 3 x diameter of the shank (see BS 1202).

NOTE: Alternative supplementary fixing may be obtained by the following: Each tile in every fourth course to be spot bedded to the head of the tiles in the course below in sand lime cement mortar.

11.1.2 If it is desirable to increase the number of courses of tiles bedded, the maximum amount of bedding of tiles should leave alternate courses without bedding.

11.1.3 Cement mortar bedding should be at the top of the tile and kept within the headlap. The side-laps should be kept clear, (see BS 8000: part 6).

12. PERIMETERS

Traditionally, eaves and tops were formed by breaking (split) tiles which may additionally be skew nailed into the (snapping) tiles across and bedding with the eave (or top of the batten top) full course. Gable verges were formed using half tiles.

13. BEDDING AND TORCHING

Where tiles are bedded for security a cement mortar should be used to avoid frost erosion. Lime mortar torching should contain hair for similar reasons.

14. GENERAL CONSIDERATIONS

14.1 Peg tiles should not be nailed to any type of lath or batten due to the amount of cocking up that occurs in the uneven tiles, which will not subsequently settle down. Tiles of more even manufacture, which have smaller nail holes rather than larger peg holes, may be either nailed to battens or hung using metal pegs.

14.2 Where a combination of pegging several courses and nailing an intermediate course is adopted, it is often possible to nail the lower of the two holes (where holes are offset) and hang on the higher one. Where double nailing is required or nail holes are not offset, the batten to each nailed course will have to be fixed higher in order to maintain even laps and margins. The amount of nailing higher would normally be 15mm to 20mm.

14.3 Battening to oast houses is often performed by double layering thinly cut battens vertically in order to follow the curve of the roof. Timber relatively free from knots will be needed. At the tightly curved top of the rafters the double layer of battens will stand vertically away from the rafters. In lower positions, where the curvature is not so great, the double layer of battens will be nailed more closely to the rafter. The tensions in the battens and the lack of substance for nailing the tiles has led to the general recommendation that jagged or ring-shanked nails should be used.

14.4 Oast houses are tiled with a mixture of normal size plain tiles combined with the three sizes of tiles tapered both sides as mentioned above. The tapered tiles will normally have one nail hole at the top edge centrally.

14.5 Care should be exercised in re-using peg tiles so that tiles from different areas, or of variable sizes, or age are not mixed together. Where supplementary modern tiles are to be used a careful comparison of shape, texture and colour should be made and, if possible the new tiles should be used on a selected roof area so that setting out and fixing may be adjusted to suit. Likewise, the use of tile-and-a-half (extra wide) tiles at gables or for cutting, if not very carefully matched, may result in obvious disfigurement.

15. REFERENCES AND INFORMATION

Code of Practice: Workmanship on Building Sites BS 8000: Part 6: Slating and Tiling

Code of Practice: Slating and Tiling - BS 5534

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