

Slating & Tiling

TIPS 31

Curved roofs

Thatched roofs – with their curved detailing at the perimeters, over dormer windows and around turrets – look graceful. Achieving the same result with roof tiles or slate is far from simple.

Tiles and slates

In the past specially designed interlocking tiles were suitable for use on a curved roof, such as a Redland Statesman. However, installation of roof tiles on a curved roof, like a cone, should only be undertaken using a double lap tile or slate. The choice between a plain tile, and double slate, will depend upon the pitch of the roof and the roof covering used on the rest of the building.

As plain tiles come in only one size, there will be a lot of cutting on site, which is very labour-intensive. For steep pitches it is possible to get Oast House tiles, eliminating most of the need for site-cutting each tile, but they are not suitable for shallower pitches. Slates are available in various sizes, so it is possible to be selective and reduce wastage on site.

The principles for forming a curve in slates or tiles are similar, apart for some different fixing arrangements. Centre-nailed double lap slates are more secure when twice-nailed than head-nailed plain tiles. But a slate that is flat in both directions tends to rest on its middle on an external curve (on plan). Therefore, nailing the slate down at the edges can cause the slate to tilt or break if nailed down too far on one side. Oast House and plain tiles with a camber in their width are better able to cope with a curved shape on plan. Where the curve is at right angles to the eaves (in section) a plain tile with a camber in its length is also more capable of coping with the curve than a flat slate, which will either kick up on an outward curve or be unsupported in the middle on an inward curve – making it easier to break.

Underlay and battens

With both slates and tiles, the underlay and battening of a curved roof on plan is not simple – neither the underlay nor the battens want

to run in a horizontal plane because the distance around the curve towards the ridge is different to the distance around the curve close to the eaves. Therefore, a roll of underlay will want to unroll in a downward curve. While timber battens want to do the same thing, they can be bent around the curve and nailed in a horizontal plane. For this reason it is best to start laying underlay uphill and to start nailing a batten at its centre and bend the batten around the curve in both directions. As the radius gets smaller it will be found that it is impossible to bend the battens around the curve and other methods will be needed such as soaking, steaming or laminating the battens, none of which is approved by BS5534, the Code of Practice for slating and tiling.

Setting out

The setting out of the curved section of roof needs to be started at the centre and worked away towards a fixed feature such as a side abutment or a verge. It is best to set out the eaves' course of tiles/slates around an external curve, and around the ridge on an internal curve, using the largest width of slates or whole plain tiles. Using a chalk line attached to the apex of the external curve, or the theoretical base of an internal curve, strike chalk lines down the battens for each tile/slate joint as a guide to cutting each and every tile/slate. This will ensure straight perpendicular joints up the roof. Every tile/slate on the curved section of roof will need to be cut. The amount of taper in the length of each tile/slate will depend upon the rafter pitch, while the width along the leading edge will vary with every course.

Side lap

As work proceeds up the cone, the tiles/slates will become narrower and narrower. This will reduce both the side lap and the position of nail holes, which will have to be re-drilled, punched or cut into the tile/slate. On shallow pitch roofs there will be a point where the distance from the side lap of the course of slates above will become



too close to the nail holes to prevent water from seeping sideways under the slates and down the nail hole. Therefore, keep the pitch of curved roofs as steep as possible.

With both plain tiles and slate there comes a point where the side lap will fall below the minimum recommended. For plain tiles the minimum side lap is 55mm and with slates it will vary with rafter pitch and rain exposure category. At this point a layer of waterproofing material, such as code three lead sheet (200mm wide for plain tiles, possibly wider for slate), will need to be installed between the courses of tiles/slates as a continuous soaker to prevent side lap leakage. It will be necessary to continue to reduce the width of the tiles/slates to maintain the perpendicular joints.

When the leading edge of plain tiles reaches 82mm, it is possible to start again with whole-width tiles. The same could be done with slates, depending upon the width of the widest slates being used. The only problem with reverting to full-width tile/slates is the course of tiles/slates will kick out relative to the course below and will be clearly visible as being different.

Fixings

Every tile or slate on a curved roof must be twice-nailed as they are less secure than on a conventional section of roof. When the head of the tile or slate gets too narrow it may be better to screw fix with one large screw rather than two nails, so as not to weaken it at this point. With fibre cement slates the hole for the copper disc rivet may need to be re punched if the perpendicular joints drift. Another good method for fixing natural slates on a curve is hook fixing.

Flashings

Close to the apex it will be impossible to fix the small pieces of tile or slate as the taper cut will reduce the length of the tile/slate. At this point the tiling/slating will have to stop and a lead cap or flashing be installed. This point should be possible to determine from the chalk lines marked on the battens and will vary with rafter pitch.

Joint drift

One method of tiling a curved roof which is not recommended is to use full width tiles and allow the perpendicular joints to drift from course to course. This will result in some side laps falling below 55mm on every course above eaves level. When this occurs it is tempting to install a tile-and-a-half to make up the lost half bond. Once a tile-and-a-half is installed, one tile-and-a-half will need to be installed on every course above that point to maintain the side lap bond. While at low level this may work, at high level where the radius is smaller the wider tile will kick out and upset the laying of the adjacent tiles. The only place a tile-and-a-half should be used is at the vertical perimeters of a plain tile roof, not in the middle.

Completion

A curved roof will contravene some British Standards, and/or the tile/slate manufacturer's recommendations, and any guarantee for the tiles or slates is likely to be null and void. Therefore, any failure of the curved roof will be the responsibility of the contractor/specifier, depending upon what the failure is.

Tips

- keep the pitch of the curved section as steep as possible
- use a double-lap product such as plain tiles or slates to cover a roof that is curved on plan
- every tile and slate will need to be cut to fit and must be fully nailed or screwed to the battens
- when the side lap falls below the minimum for the tiles or slates, courses of waterproofing material such as code three lead sheet should be installed
- avoid letting perpendicular joints drift and using a tile/slate-and-a-half to correct it

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