

# Slating & Tiling

## TIPS92

### Sprocket eaves detail – part two

Plain tiles that have a camber in their length are designed to only touch at the head and the tail on the underside and be rested upon 100mm up from the leading edge by the tile above, so the tile has to be relatively thick to provide the rigidity it needs. Therefore plain tiles are able to cope when tiles are not laid in the same plane, provided the true pitch of the eaves tile is not below 25° (rafter pitch less true tile pitch). This means that, to form a sprocket at the eaves, the rafter pitch will need to be much steeper than the normal minimum rafter pitch of 35°.

Where roof slopes meet at valleys and hips, the sprocket will have an effect on the fit of the arris/curved valley tiles and the arris/bonnet hip tiles. Hips may require bedded hip (ridge) tiles, and valleys may require an open lead valley to be used. If an arris valley tile is specified it may be possible to mitre cut the valley with lead soakers at the sprocket, and similarly with arris hip tiles at a hip. Where one roof slope has a sprocket and the adjacent does not, then it is not advisable to install valley tiles or a mitred valley or bonnet/arris tiles or mitred hips. An open lead valley which will change direction and bedded hip (ridge) tiles that do the same thing will be needed.

#### Interlocking tiles

With interlocking tiles, the relationship between the top surface of the lower tile and the underside of the upper tile is critical to allow the weather bars to perform their function of preventing wind driven rain from blowing in between the tiles.

If one course of tiles lays at a steeper true pitch to the course of tiles below, only the leading edge of the tile will make contact with the underside of the tile, reducing or preventing the weather bars from performing their function. Above 30° this may not be an issue, but below 30° it will have a detrimental effect. For tiles that can be laid down below 20° it is critical, as gravity is not working in your favour, but the true tile pitch should never be any less than 5° below the minimum rafter pitch for that design of tile.

Tiles that only need to be nailed, or not fixed at all, at the eaves sprocket may not present a problem, but where the second and third course of tiles need to be clipped, the length of the clip from the batten to the side interlock will increase, requiring a longer clip. In some cases where it is a tile-to-tile clip, it is impossible to fix unless the tiles lay in the same plane, and therefore impossible to comply with the manufacturer's fixing requirements.

While it is tempting to fit a clip for another tile or from another manufacturer, the performance of that clip in that situation will be

unknown, so calculating the wind uplift resistance will be difficult without test results for that combination of tile, clip and pitch difference. The relationship between the tiles on each subsequent course will be different, making the clip length and hook angle different.

As with plain tiles, where roof slopes meet the true pitch of the hip and the valley will also be affected. If the true pitch of a hip or a valley is approx 5° less than the rafter pitch it is possible that with an open lead valley that the width of the open channel over the length of the sprocket will need to be widened, as the water flow will tend to back up unless the capacity is increased, making GRP valley troughs unsuitable.

Also, if it is decided to change from a GRP valley trough to a lead open valley for the length of the sprocket, the amount of lap of the lead up under the GRP needs to be taken into consideration. Unless the true pitch of the valley is above 30°, the lap will be more than 150mm. If the true pitch of the valley is 11° (rafter pitch of 15°), the lap will be 390mm; if the true pitch is less than 11°, then the valley is too shallow to allow for a lap in the construction. It would be better to avoid a sprocket on an interlocking roof unless the true tile pitch is over 25° and tiles do not need to be clipped.

#### Double lap slates

With double lap slates, either natural or fibre cement, a sprocket is problematic, as unlike plain tiles, they are thin flat slabs that need to be fully supported over most of their length. The slates should not be laid below their minimum true pitch, which is approx 3° less than the recommended rafter pitch for a given slate size, thickness, nail hole position and head lap, for a given location. Because the slate is flat, if the upper slate lays at a steeper pitch, only the leading edge makes contact with the slate below and the top edge make contact with the batten. This means that at the centre nail hole positions there is a large gap, which means that a standard fixing nail is often not long enough to penetrate the batten by the minimum 15mm. On each subsequent course, the nail length required will be different. It is common for packing battens to be installed against the head of the batten at the centre nail position. For each situation, the thickness of the packing batten will need to be measured and cut before being installed. Also, the nail hole position needs to be moved approx 50mm up the slate to allow the slate to be nailed into the packing batten with a standard slate nail. Using a long



*The clay plain tiles have been formed into a sprocket over an inset balcony. The sprocket diminishes to nothing over four courses. With a steeper pitch it may be over five courses*

nail into the lower slate batten is not a good idea, as it is very easy to break the slate if over nailed at this point, and if left under nailed will allow the sprocketed slate to rattle in the wind.

Slates at the eaves are always vulnerable to breakage from tradesmen gaining access to the roof. But double lap slates on a sprocket are more vulnerable to breakage at the eaves as they are not fully supported and may be under stress if there is no central packing batten. Even if there is, there is still a risk of breakage, as they are not fully supported.

With fibre cement slates, where the copper disc rivet is held between the slates, and the pin protrudes up between the slates. With a sprocket the slates are not laying in the same plane, so the copper disc rivet drops down onto the lower slate, reducing the pin length that can be bent over. It is possible, with a pair of pliers, to pull the rivet pin up before bending the rivet pin over at 90°, but it is not easy, and the rivet may end up being loose. FC slates, when new, are slightly more flexible than natural slates, so can be bent to a slight curve, but will break with too much of a bend.

#### Conclusion

Provided the roof pitch is relatively steep and that the eaves course of tiles are not laid below the minimum true tile pitch (rafter pitch less tile pitch) and the tiles are nailed into position, then it is possible to achieve a sprocketed eaves detail. However, with natural slates, packing battens will be needed and there will always be a risk of slates breaking at the eaves. Provided the sprocket is no more than 5°, FC slates will cope with the sprocket. Overall it is a lot of extra work and responsibility for little or no gain.

#### Tips

- Set out and measure the true valley pitch before you construct the valley, as it may be impossible to use most forms of valley.
- Order extra slates and slate hooks to repair the broken slates that will occur at the eaves.
- Avoid using interlocking tiles in windy locations on a roof with a sprocket.

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