

Slating & Tiling

TIPS91

Sprocket eaves detail – part one

PITCHED ROOFING

Curves of any kind on a roof soften the look and make it look either very modern, or very old. But achieving a curve in the length of the rafter at the eaves using what are, in general principle, flat and square slabs of clay, slate or concrete is far from ideal, but possible.

This first part looks at the background and causes of sprockets and how they should be approached.

There are certain compromises and facts of life that need to be understood and worked within to achieve a sprocket at an eaves; but first we need to define what it is we are talking about. A sprocket eaves detail is formed when the lower courses of tiles or slates lay at a shallower true pitch than the tiles or slates in the courses above. Why does this happen, or why would anybody want to form this detail?

History

The origins can probably be traced back to cruck-framed houses where columns were bent over to form the roof structure onto which were fixed purlins and common rafters. The floor joists were extended out to beyond the wall face and an additional purlin connected between ends of the floor joists. This meant that the eaves course of tiles or slates were often laid at a shallower angle, but as the main rafter pitch was very steep and the roof was covered with thatch it was not an issue.

Between 1900 and 1930 it became popular with the arts and crafts movement to introduce features into houses that harked back to old styles of housing using natural materials, like brick, stone, plain tile, or stone slate. This was fine for rich people who could afford such flights of fancy, but the architects and planners picked up some of the design features and insisted that these were perpetuated to try and maintain the look of a bygone era. Unfortunately the construction of a modern house is very different to the traditional cruck-framed house with a thatched roof covering, and therefore not always appropriate for a sprocket.

Construction

Today the most common reasons for forming a sprocket are:

- Using a depth of fascia board that is too deep; the carpenter sets the soffit to just miss the head of the upper floor windows, installs the fascia board from that point and does not cut down the top edge of the fascia board.
- An over fascia ventilation grill has been specified and no allowance has been made with the height of the fascia board, so once the grill is installed the overall height is too high.

• The architect specifies a very deep soffit to give the building a Mediterranean look, but does not correspondingly lift the roof to allow the rafters to be extended at the same rafter pitch. By going horizontally outwards and not correspondingly upwards the extended rafter has to be at a shallower angle. In the past the reasons may have been to make the rafter length an exact module of the tile or slate gauge, to prevent the need for cutting tiles at the ridge course.

The roof covering will always follow the line of the rafter, but form a curve made up of facets between the fascia board and the main rafter pitch; sometimes in one sweep and sometimes in two sweeps, depending upon the extension rafter. It is therefore almost impossible to hide a sprocket if it is formed within the roof structure. Some specifiers firmly believe (because they have been told by their peers) that it is good practice to form a sprocket at the eaves, because it slows the rainwater down as it comes off the roof and into the gutter. Whilst it is true that water running off a shallow rafter pitch will flow at a slower speed than from a steep pitch; where the water flowing down a steep rafter pitch meets a sprocket, the water goes into ski jump mode and keeps travelling at the same speed. However, it now has a new direction of travel and will overshoot the gutter during heavy rainstorms.

Sprocket curve

Depending upon the thickness of the tile or slate, and the gauge at which they are set, this will determine the amount by which the sprocket will diminish; the ratio is in the region of 1:8. This means that under most circumstances if the true pitch difference between the first course and the second course is 16°, the true pitch difference between the second and third course will be 2° and between the third and fourth course will be 0.25°. Therefore under most circumstances a sprocket will extend over about three or four courses before it becomes too small to measure. The relationship between tiles on adjacent courses is very important and therefore introducing a true pitch difference of, say, 10° can be very detrimental.

Regardless of which roof covering is to be used on the roof, the true pitch of the eaves course must not fall



The difference in true tile pitch between the first and second course may not look very much but is more than 5°. This was caused by the brick corbel eaves detail being one brick too high. This is not helped by the guttering being too low

below the minimum recommended for that roof covering. Because tiles and slates lay at a shallower angle than the rafter that they are fixed to as they lap onto a tile or slate below, allowance has to be made as all recommendations are quoted as rafter pitch not true tile/slate pitch. With plain tiles, depending upon their thickness and camber, the true tile pitch will be between 9° and 10° less than the rafter pitch. For most interlocking tiles the true tile pitch will be between 4.5° and 6° less, and for double lap slates will be between 3° and 4° less. Therefore the minimum true tile/slate pitch for the eaves course is the minimum rafter pitch less the tile to rafter pitch. For instance a flat interlocking concrete tile with a minimum rafter pitch of 17.5° will have a true tile pitch of 13° and a plain tile will have a minimum true tile pitch of 26°.

Conclusion

Sprockets at the eaves are visually pleasing to create that old traditional look, but can also cause problems when they are constructed for decorative purposes only. The steeper the rafter pitch, the easier it is to get water into the gutters at the eaves.

Tips

- Never lay the eaves course of tiles or slates below the recommended minimum true pitch.
- When re-roofing where there is a sprocket, always use the same type of roof covering as used previously, as it will have been chosen wisely.
- Avoid where possible a sprocket formed on a new roof.

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