

Slating & Tiling

TIPS 77

Unequal rafter pitches

The vast majority of pitched roofs with more than one roof slope will have the same rafter pitch on each roof slope. This is done for the good sound reason that it makes all of the roof construction and roof covering as simple as possible. But once roof slopes of different angles meet, then all sorts of complications arise that generate problems for the installation of the roof covering. What looks logical on an architect's drawing, is often a nightmare on site.

There may be extenuating circumstances that prevent adjacent roof slopes from having the same rafter pitch, but the reasons for such actions are mostly forced on the construction by a planning constraint that requires a visual break between the original and the new roof, without exceeding the ridge height, or some such excuse. To overcome such demands, compromises have to be made to make the resulting differences in the rafter pitches work.

Eaves

Starting at the eaves, unless the top floor windows are at different levels the bottom of the fascia boards should be level to allow the casement windows to open without hitting the fascia board.



Because of the differing rafter pitches, a valley and a hip converging in the middle of a roof. The hip tile at the bottom of the valley is blocking the natural water flow and causing water to back up through the tiles and causing a roof leak.

The height of the fascia board should be fairly consistent to allow the guttering to link around the building without back-falls or steps. This means that the eaves course of tiles or slates should all start within approx 25mm of the slates or tiles on an adjacent roof slope. If the adjacent roof slopes are vastly different in angle, the soffit overhang for the shallower pitch will have to be reduced.

There is a theoretical point at which the top line of both the shallow and steep pitches will coincide, and this should dictate the eaves overhang, however this point may not be far enough out to suit the design of the building.

The alternative is for the level of the wall plate on the steeper rafter pitch to be raised, or for a sprocket, or reduction of rafter pitch, approaching the eaves. A sprocket on the steeper rafter pitch at an eaves can produce other problems, and only works well with a plain tile roof, with interlocking tiles and slates the sprocket may look architectural, but will compromise the performance of the tiles and slates.

Hips

Where adjacent roof slopes have different rafter pitches the number of tile or slate course on each slope will be different. Therefore the cuts will be different and a lead roll, or a hip/ridge tile will be needed to weather the junction. If there is a sprocket on one, or other, roof slope then the line of the hip will change where the sprocket starts, with the result that the hip will have a kink in it. If the two rafter pitches meet at a plan

angle of more than 90 degrees then the hip can change to a position where water runs into the side of the hip on one side, and away from the hip on the other. This results in a hybrid hip and top edge abutment detail.

Valley

Where different pitch roof slopes meet at a valley at more than one or two degrees different, it will not be possible to use plain valley tiles or a mitered valley with plain tiles, or a mitered valley with double lap slates, therefore an open lead valley should be used. As with a hip, where one roof slope has a sprocket and the other does not, the line of the valley will not be straight. If the building is not square and the roof slopes meet at more than 90° on plan then the valley can change to a position where water runs into it on one side, and away from it on the other. This results in a hybrid valley and raking top edge abutment detail.

Where different pitch roof slopes meet at a valley the water run off from the steep side will be faster than from the shallower side, and therefore the water flow will not equalise in the centre of the valley. In extreme cases the water will drive in under the tiles, or slates, on the shallow slope and can cause leakage at that point.

Hip and valley

Where hips and valleys are in close proximity to each other there is always the risk that with differing rafter pitches the two will converge and meet in the middle of a roof slope, forming a very difficult junction to weather.

Ridge

Where the roof slopes either side of a ridge are different, the ridge tile will not sit square but will tilt towards the steeper roof slope. If this is corrected it will result in one slope having insufficient lap under the ridge tile and difficulty fixing into the ridge board or batten. Whilst it may look cock-

eyed, the ridge tile should sit equally relative to the two roof slopes, and not square to the horizon, which is most noticeable with ornamental ridge tiles. To visually overcome most of these problems half-round ridge tiles should be used, as angular ridge tiles accentuate the problem.

Conclusion

With all projects, always check the rafter pitches of each slope to see if there are any roof slopes with a different rafter pitch to the rest, as the drawings may not be correct or there may not be any drawings. Check to see on the roof plan if all hips and valleys are straight and equally bisect the angle between the adjacent eaves lines; if they do not then expect differing rafter pitches. Having understood the variations in rafter pitch and the difficulties that it will create, think twice about each perimeter detail. It will not affect the tiles or slates in the middle of a roof slope, but will affect the perimeter detailing. Wherever possible keep all rafter pitches the same, and at most have two rafter pitches over the complete project – more than that will become a nightmare.

Tips

- Check each rafter pitch angle before starting work.
- Set out the shallower rafter pitch first and adjust the steeper pitch to suit.
- Avoid using hip and ridge tiles that have angle or sharp profile lines that can accentuate the misalignment caused by the different rafter pitches.
- Wherever possible avoid the use of a sprocket at the eaves to overcome the differences between different rafter pitches.

Compiled by Chris Thomas FIoR
The Tiled Roofing Consultancy
2 Ridlands Grove, Limpsfield Chart, Oxted,
Surrey, RH8 0ST
tel: 01883 724 774

email:
chris.thomas@thetiledroofingconsultancy.com
To view previous Slating & Tiling Tips, go to:
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