

Slating & Tiling

TIPS 83

Below minimum rafter pitch

The minimum rafter pitch for any roof should be determined by the material and type of roof covering. But sometimes other issues creep in and cause the roof covering used to be below its minimum rafter pitch parameter. What are the consequences if this happens? It is fair to say that the new visitors' centre built at the top of Snowdon will experience more wind driven rain and snow than a terraced house in Swindon, requiring the roof to be built to cope with the vastly different weather conditions that prevail at the top of a mountain.

But 80% of all roofs in the UK are located in fairly sheltered lowland locations with similar climatic conditions, and it is therefore not unreasonable that minimum rafter pitch recommendations reflect the majority rather than the more exposed minority. If the industry or manufacturer's recommendation are ignored then whoever makes that decision should take responsibility for the consequences, if and when the roof leaks, or fails.

Common situations

Why would anybody want to put a pitched roof covering onto a rafter pitch that is too low for the roof covering? In many instances there is pressure from the planning authority to keep below a designated ridge height, and to use a particular roof covering, which may not be compatible. Often the designer will have second guessed the planners' demands and allowed for a hidden flat roof at ridge level. Predicting the problem will always allow the designer to design out the problem.

It is often changes to the design after planning approval that can cause problems, such as the inclusion of a splay across the internal corner of an L-shaped building, forcing a new roof slope from the splay back up to the ridge. This new roof pitch will be shallower than the adjacent roof slopes, as the rafter length will be longer for the same rise.

If the roof covering on the main roof slopes are at, or close to, the recommended minimum, then the splay roof will fall under. One solution is to pitch the roof at the same angle as the adjacent roof slopes and form a triangular flat roof at ridge level.

Another common situation is building a ground floor extension with a lean-to roof. The further the extension extends away from the building, the lower the rafter pitch needs to be if it is to be constructed below the window sills of the floor above. The only option may be to form cut-outs in the roof and form an internal dormer with a flat roof from the window sill out to the pitch line for each window position.

Common remedies

When met with the situation of the rafter pitch being below the minimum for the roof coverings, many building control officers have allowed the work to proceed if the underlay is doubled up. This option is perhaps the easiest to undertake, but the worst of all solutions, as this acknowledges that the roof covering will not keep out the rain, and the underlay will be expected to drain away the water that gets through, to the eaves. Firstly the battens are going to get wet, which will not do them any good, secondly this makes the underlay the primary water resistant layer, which it was never intended to achieve, and the product testing would have reflected this.

With some types of underlay, if the material is wet or damp for long periods, the material will begin to break down. If the material shrinks, or is laid flat under counter battens, then the water may soak under the counter battens and down the holes in the underlay made by the batten/counter batten nails. At the eaves the reduction of pitch and/or the introduction of a counter batten could result in a back fall of the eaves tilt fillet, which allows water to pond behind the fascia. At an inclined valley, water running down the underlay will need to be chan-

nelled down the side of the valley construction past the ends of each timber batten, forcing the valley construction to be redesigned. This is possible, but far from ideal.

The use of corrugated sheeting over the rafters and under the battens is popular for gable to gable mono pitches, but makes the eaves detail difficult, as the guttering has to be lowered to collect the water running off the corrugated sheeting. This often results in the water running off the tiled roof covering, over-shooting the gutters during deluges.

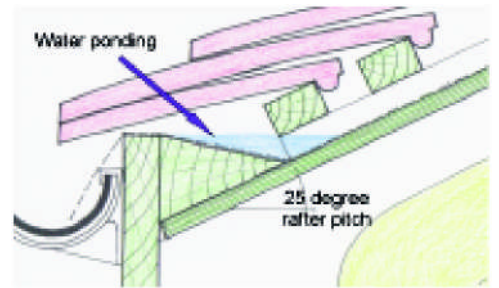
Liability

Tile manufacturers are reluctant to sanction an extension to their guarantees for below minimum pitch situations. Building control officers take no liability for passing such a construction. Some underlay manufacturers may allow their product to be used within strictly defined conditions. Architects and specifiers show it on their drawings as being above the minimum pitch, so they are not liable. It is left to the poor old roofer who follows on after the carpenter, and has to use the roof covering that has been specified, which may be inappropriate, to take responsibility for the construction problem not of their making.

What to do

Designers should design the roof with all rafter slopes having the same rafter pitch, and with a 10 to 15° differential between the tile/slate minimum pitch recommendation, and the actual rafter pitch. This helps with room in the roof situations, saves on the length of expensive lead flashings, and looks better than a shallow pitch; where you look up the roof slope at the exposed leading edges.

Contractors should always check the actual rafter pitches of



The combination of going below the minimum pitch, and placing the underlay under a counter batten can result in water ponding on the underlay, which will cause problems at a later date.

each roof slope and report discrepancies to the main contractor, or client, as soon as possible so that they can make a decision, or make alterations, before the roof covering is installed. All contractors should resist the temptation to change the specification to save money. The right tile/slate for the pitch should be used, or the right pitch for the tile or slate roof covering specified should be used.

Conclusion

If you analyse the situations where slates or tiles are installed below their recommended minimum rafter pitch, in most instances there was a lack of design, or a lack of specification, or a lack of supervision, or a lack of understanding of the knock-on effect of a change during construction, and the result is a compromise that is to nobody's advantage, when it goes wrong and the roof leaks. Provided you keep above the minimum pitch parameters at all times, this should eliminate the problem.

Tips

- Check the drawings for any discrepancies or apparent changes of specification.
- Check the pitch of each roof slope against the proposed roof covering.
- Use patented under roof solutions to overcome a minimum rafter pitch problem with suspicion, unless it has a solid guarantee.

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