

# Slating & Tiling

## TI PS 82

### Fixing the top course of slates

**W**hen I am asked to inspect or investigate broken or slipped slates on a pitched roof, the most common problem that I find is the top course of slates have not been installed correctly. Most slaters think that what they have constructed is correct, but is it?

#### First principles

To understand what should be done, we need to go back to the first principles of how a slate on a pitched roof stays on, and what forces try to remove it. Firstly we have weight, which pushes the slate onto the surface of the batten but, because of the angle of the roof, may also cause the slate to slip down the roof slope by the force of gravity. To prevent this happening, the slates are nailed or hooked to the battens.

There are two locations for nails: centre-nailing or head-nailing. Head-nailing is normally undertaken with heavy and small slates where the force of wind suction on the exposed surface of the slate is insufficient to lift the slate. But with large, lightweight slates, centre-nailing is used, as the nail position acts as a pivot – which is more efficient – and the wind suction on the exposed surface of the slate is resisted at the opposite end of the slate that rests on a batten, turning uplift into downward force. Provided the slate is rigid, this transfer of an upward force at the lower end to a downward force at the top end should not bend or break the slate.

#### Types of slates and fixings

With fibre cement slates, which are thin and can flex in their length, a copper disc rivet is used to transfer the majority of the wind upward force on the exposed surface of the slate to the edges of the slates below and into their centre-nail fixings. Therefore, provided the cut course of slates that finish at a ridge or top edge abutment are head-nailed and fixed with copper disc rivets

at the tail, the wind uplift forces will be resisted into the course of slates below.

With resin slates that are a bit thicker than fibre cement slates, and will flex slightly less in their length, there is no copper disc rivet fixing, so when the head of the slate is cut off and the top slate is head-nailed, there is nothing but the weight of the ridge tiles or the flashing to hold the slate down.

With natural slates, which are very rigid, once the head of the slate is cut off, again there is nothing but the ridge tiles or the flashing to hold the slates down against the wind uplift forces on the exposed surface of the slate. Wind uplift forces on natural slates that are fixed with slate hooks have their force resisted by the slate hook through to the batten below and, therefore, when the heads of the top slates are cut off, provided the slates are fixed with the slate hooks, the slates will not lift.

#### Top edge detailing

We have seen that if a copper disc rivet is used at the tail of each top slate this will hold the slate down, as will a slate hook, but to stop the slates rotating about that fixing to the left or right, the top slates also need to be head-nailed. But, where rivets or hooks are not used, there are two other systems.

Firstly there is the shouldered method. This entails cutting off the two top corners of the last full course of slates at 45° to leave about half the width of the slate along the top edge. The batten that is located under the top edge of the slate is positioned about 25mm down from the top edge of the top of the slate so that it can only be seen in the V-shaped spaces between the slates. The top course of slates should now be cut such that the top edge finishes flush with the top of the slate below. The only way the cut slate can be fixed is to punch two new nail holes in the slate to coincide with the centre line of the batten, as far apart as possible.

When the top course of slates are not fixed correctly, the wind will lift them and the lead flashing up. Note how three slates have been sucked out and two of the copper clips have been affected.



The effect of moving the batten down, and the top edge up, is to make it difficult for the cut top course of slates to rotate about the new nail positions.

Secondly there is the double-batten method. With the double-batten method, a second, larger batten is placed above and against the head of the normal top batten. The thickness of the second batten should be equal to, or a little more than, the thickness of the batten plus the thickness of the slate, (normally 32mm). The top cut course of slates are cut with the top edge level with the top edge of the thicker batten. These cut slates are then twice nailed as normal into the thinner top batten against the top edge of the course of slates below. This means that between the nail and the top of the slate will be about 75mm, which is sufficient to stop the slate rotating upwards. If the second top batten is the same thickness as the other battens (25mm), then the top slate will kick up, or can be lifted by the wind, until the head of the slate meets the second batten face.

#### Ridge tiles and flashings

Some slaters and tilers believe that a mortar-bedded ridge or a lead flashing is sufficient to hold a head-nailed top slate down. This is not the case, as it is a bit like pulling a nail out with a claw hammer. The exposed surface of the cut slate is usually much longer than the lap of the ridge over the head of the slate so, in most instances, the slate will lever up the ridge tile and break or crack the mortar bedding. Even with dry-fix ridge systems, the

ridge may not come off but can be levered over to one side. With flashings, clipping the lead flashing helps prevent the lead lifting, but is not strong enough to resist the combined leverage of the top slate and the lead flashing.

#### Conclusion

Head-nailed slates such as stone slate should cope with being head-nailed at a ridge or top edge, especially if they are nailed onto rigid sarking. Fibre cement slates that are fixed with copper disc rivets should not require additional fixings at a top edge, but double-lap, centre-nailed slates should be either fixed with slate hooks and nails, shouldered and nailed, or a second, larger batten should be installed to stop the head of the slate from moving once it has been twice nailed to the lower batten.

#### Tips

- Gauge out the roof and see where the last course of slates finishes below the ridge or top edge before deciding which method of additional fixing you will use, as sometimes there is insufficient room to install the double batten method.
- All ridge tiles should lap over the top slate by a minimum of 75mm.
- In very windy locations, it may be appropriate to use slate hooks and shoulder /double-batten the top slates to fix them.

Compiled by Chris Thomas FloR  
The Tiled Roofing Consultancy  
2 Ridlands Grove, Limsfield Chart,  
Oxted, Surrey, RH8 0ST  
tel: 01883 724 774  
email: [chris.thomas@thetiledroofingconsultancy.com](mailto:chris.thomas@thetiledroofingconsultancy.com)  
To view previous Slating & Tiling Tips, go to:  
[www.thetiledroofingconsultancy.com](http://www.thetiledroofingconsultancy.com)

