Slating & Tiling

TI PS 88

Saddles

A 'saddle', in the building construction sense of the word, is "a piece of flexible metal about 450 x 450mm dressed to shape and fixed under slates and tiles at vulnerable points, such as the intersection of a dormer ridge and the main roof ". What more do we need to know?

Material

For centuries the only suitable material that could be used for such a tricky job was lead sheet, being malleable enough to be made into the shapes that are unique to each situation. Other metals can be folded, cut and lapped to shape, but none so easily as lead.

Now we have many expanded metal reinforced rubber and plastic-based sheets that are used for flashing that can be stretched into a shape similar to lead. In general they will not last as long as lead sheet, but could achieve the same result. Certainly if the rubber and plastic-based flashing materials are being used on the roof for flashing, it would not be unreasonable to use the same material for a saddle, provided the manufacturer did not specifically exclude the material for use as a saddle.

Size

The size of 450 x 450 mm is a throw back from the old imperial 18 x 18in which was suitable for most situations where the rafter pitches were mostly above 30°. Now that we have rafter pitches down to 12.5°, and some true inclined valley pitches down to 11°, the size of the saddle will often be greater than 450 x 450mm.

To determine the actual suitable size for the saddle the true pitch of each surface that the saddle is protecting needs to be measured and the appropriate lap over each surface determined. For instance at the head of two valleys where a 15° dormer meets a 15° roof slope, the true valley pitch will be 11°. The lap for a true pitch of 11° is 390mm, times 2, plus 50mm wide ridge board, the minimum width of lead sheet should therefore be 830mm. As one side will lap under the tiles at 15° the lap should be 290mm, plus the width of the valley 150mm, plus 150mm under the ridge tile, plus a 25mm welt, making 615mm, requiring a saddle 830 x 615mm minimum.

Now I know that you will think that this sounds extreme, and yes 15° rafter pitches are extreme. It is unlikely that a saddle will ever exceed 900 x 900mm and rarely ever be less than 450 x 450 mm to comply with the recommended lap requirements for lead sheet flashings. The actual size of the saddle will be very pitch and situation dependent.

Location

The most common places that a saddle would be expected to be installed are at the head of two valleys where they meet. At the base of a valley where it discharges back onto a roof, especially with a GRP valley trough. At the junction of two hips and a ridge, or a ridge and a hip, or a hip and two ridges and a valley. At the junction of a ridge, or hip, and a vertical wall face such as a chimney. There are other situations but they are not as common.

In most instances they can be defined as where there is no proprietary component that bridges between the two features, and in many instances mortar bedding is used, but not always. As we know from lead valleys it is not a good idea to place mortar directly onto the top surface of lead as it will prevent it shrinking and stretching, and will eventually cause the lead sheet to fail. But in most instances there is no space, or ability to be able to do anything other than place the mortar on the lead sheet.

What is not considered is that the lead sheet is not mechanically fixed to the tiles or slates below, and therefore the ridge or hip tiles are bedded onto a layer that is not fixed to the tiles, leaving the hip or ridge tile vulnerable to being disturbed by hurricane force winds, unless they are separately mechanically fixed to the roof structure.

Shape

Once the saddle has been dressed to lap under and over all the surfaces by the required amount, laps under hips or ridges should be welted to stop any water running off the edges of the sheet. The ridge and hip tiles should be installed and the excess lead sheet trimmed off to a neat line; care must be taken not to compromise the lead lap. For instance a ridge or hip tile should lap over the adjacent tiles or slates by about 75mm, give or take about 10mm. But at 30° the lead lap over the tiles or slates should be 150mm, so about 75mm of lead saddle should be left visible below the line of the hip or ridge. At shallower rafter pitches this distance will increase. Some components like GRP dry valleys where there is a central rib up the middle, present a problem as the skill needed to form a saddle that links the two upstand ribs would require some careful folding and lead burning to get it right. In that situation it may be better to dress the lead over the top surface of the tiles and not directly on the GRP itself, ensuring that there is the right amount of lap with the top of the GRP trough.

The 300mm-wide lead saddle does not lap the ridge tile by 150mm at the edges, is not clipped down against high winds, and does not lap the GRP dry valley below by 250mm (true valley pitch 17.5°). But otherwise is quite neat!

Conclusion

The use of lead as the material to form saddles on roofs, is being challenged by the new flashing materials, but is still the standard by which all others are judged. The saddle size that most specifications demand, of 450 x 450mm, is in many cases too small for the situation and is either used incorrectly, or has to be claimed as an extra on site after being measured accurately.

Mortar should not be placed directly onto lead sheet but is almost unavoidable and the hip and ridge tiles above a saddle should be mechanically fixed as there will be no adhesion to the top tiles or slates, only to the lead saddle which is not mechanically fixed. Finally not all saddles can be located under tiles or slates and each situation has to be judged separately.

Tips

- All lead saddled should be secured to at least one component, either into a brick joint, or nailed to a ridge or hip rafter.
- The saddle should comply with all the minimum lap requirements for each true pitch of each surface.
- All lead surfaces should be fully supported as it cannot support its own weight.

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