PERIPHERY ROOF AREAS

The area around the edge of a roof requires extra fixings to stop it lifting, but how much of the total roof area needs these extra fixings?

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It is widely understood that edges of roofs are subject to higher wind suctions than the main body of the roof. Many published diagrams show this, and most of us have seen roof edges starting to lift in high winds. This lift has been measured experimentally and is included in most loading standards around the world.

Higher density of periphery fixings

For many years, the standard practice for roof cladding in New Zealand has included higher fixing densities on the edge purlin at the eaves than for the rest of the roof. These requirements were formalised for the first time in NZS 3604: 1999 *Timber framed buildings,* which included provisions for increased purlin fixings to rafters or trusses.

Wind loads in NZS 3604 are based on the New Zealand loading standard NZS 4203: 1999 *General structural design and design loadings for buildings.* The typical approach in loading standards (including NZS 4203) is to require higher loads on the roof cladding (and its immediate supporting members such as purlins or battens) at roof edges, ridges and hips.

The NZS 4203 provisions are summarised in Table 1, which gives the increased loads as multiples of the loads on the main body of the roof.

For simplicity, in NZS 3604 the higher loads at ridges and hips were included for all roof slopes, not just those steeper than 10°. This decision was influenced by the fashion at the time for generally steeper roofs than are common today. It was considered that very few roofs would benefit from the extra complication.

Diagrams in NZS 3604 confuse

Since the publication of NZS 3604: 1999, there have been many comments about the diagrams in Figures 10.16 and 10.17, which show the periphery areas of roofs requiring extra purlin fixings to rafters or trusses. They are clearly *not* drawn to scale. How did this happen?

The initial draft of NZS 3604 included the higher (2 times) fixing loads in the 0.1 × width edge strip only, and the diagrams were drawn accordingly. However, at a late stage, before publication, it was considered more realistic (considering that the end purlin has less loaded width than an internal purlin) to allow for 1.5 times loads in the wider 0.2 × width edge strip.

Unfortunately, in the rush to publication, the text was altered but the diagrams were never redrawn, leaving the misleading pictures in NZS 3604.

Wind lifting an insecure roof, starting at the point of greatest uplift.

Where is the periphery area?

Figure 1 has the periphery areas drawn to scale. This gives the width from the edge or ridge in which extra purlin fixings need to be applied.

Table 1: NZS 4203: 1999 load provisions for roof cladding.

	Increased load demand (multiple of demands on the main body of the roof)	
	Within 0.2 × building width from the edge or ridge	Within 0.1 × building width from the edge or ridge
Roof edges	1.5 times	2.0 times
Ridges and hips of roof slopes *less than* 10°	1.0 times	1.0 times
Ridges and hips of roof slopes *greater than* 10°	1.5 times	2.0 times

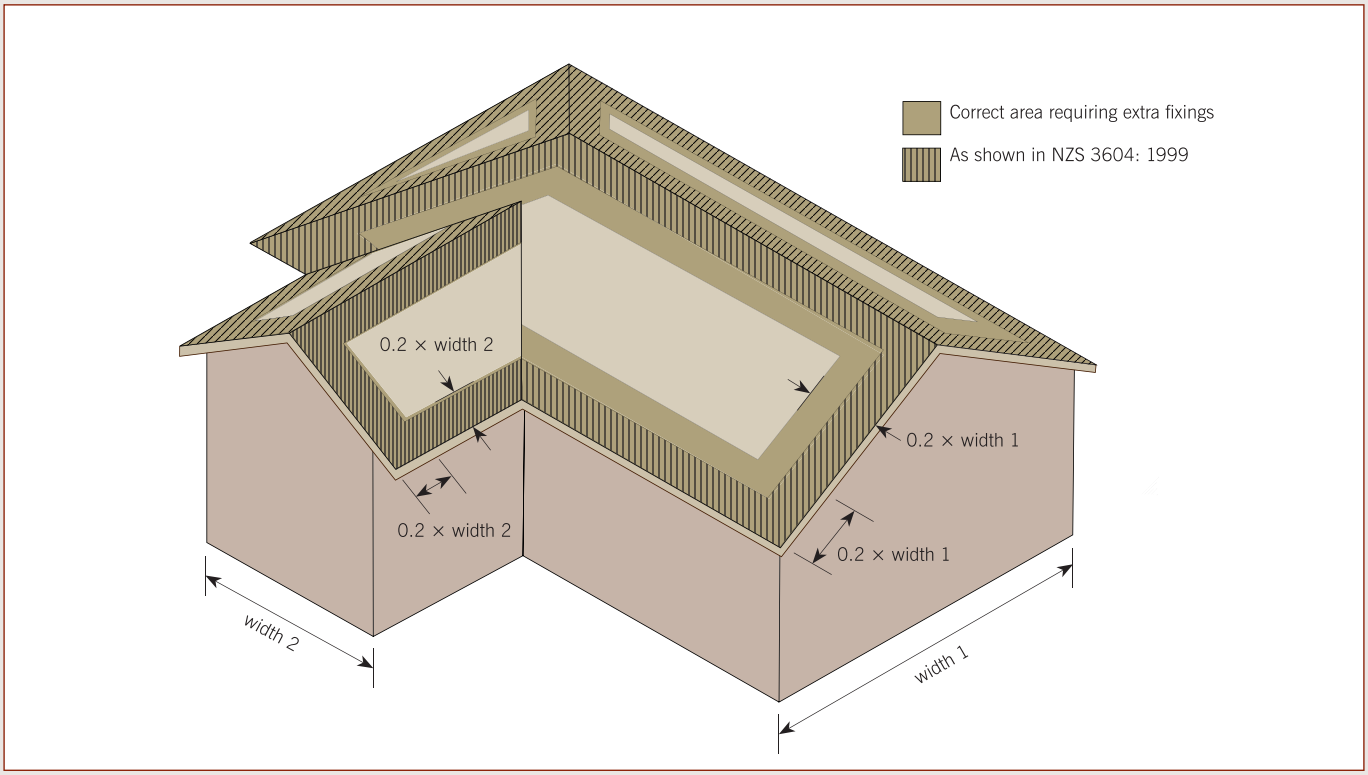

Figure 1: Hip and valley roof showing the areas that require extra purlin and batten fixings. (Adapted from NZS 3604: 1999, Figure 10.17.)