GANG-NAIL GUIDELINES No.141

ANOTHER MITEK ADVANTAGE

ON THE VERGE OF GETTING IT RIGHT PT 1 - DESIGN

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Gable, or "Verge", overhangs are a roof component that come in and out of fashion.

Varying from raked, to boxed to tapering, they are often the subject of complaints, because even a minor variation in roof line is easily seen (Fig 1).

There are many different ways of constructing verge overhangs including: cantilevered battens, outriggers (Fig 2), "verge", "gunstock" or "Z" sprockets (Figure 3 and 4) and underpurlins.

Each of these has their place and all have their limitations. Over time many truss suppliers have developed their own gable construction preference, usually in conjunction with their regular customers.

In addition to the visual appeal there is a definite structural requirement for the verge material.

The overhangs have to support not only the roof material and wind loads but also the occasional load of a person for maintenance purposes.

Relatively recent developments in software used for designing roof structures has resulted in the ability to design most common fabricator supplied methods (outriggers, Z-sprockets and underpurlins).

In the past they were usually determined from tables and recommended details.

The issue with tables and details is that they are used correctly initially, but over time the supplier can become so used to the "normal" detail that it becomes simply "the way it's always been done" and reference tables cease to be consulted.

There would be no problem with that if everything remained the same, but they don't - overhangs increase, rules for support loads change, roof materials and wind regions vary from job to job.

It is vital that the verge overhang support materials and the trusses that in turn support them are designed correctly for each and every case.

A gable end is really a system of elements working together and the adequate performance of each element is necessary.

The most common areas of concern, setting aside the individual truss designs, are:

- The verge overhang - direct supports; supporting; particularly outriggers and sprockets
- The overhang corner (Fig 6); in turn barge rafter and eave fascia material

The verge overhang has the same design requirements of any other overhang including the need to support a live load at the end.

FIGURE 1
Got it wrong...

FIGURE 2
Outrigger method.

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This is often the governing load case as it creates a turning force next to the end truss (Fig 5).

This is very important in the design of sprockets as it affects the size of the nailplate based on the joint capacity of the timber.

Usually verge sprockets are used for short overhangs and the need to support a live load is forgotten and "nominal" plating and overlaps are used " 'cos' it's only a short overhang..".

Outriggers too, need to be correctly designed taking into account the support required inside the roof space to allow for the usually larger overhangs.

Even using a rule of thumb like - "as much out as in" is not a satisfactory design technique, particularly for the outrigger at the lower end of the overhang.

Sometimes more than one 'setdown' or raking truss is required to give sufficient support for a large overhang.

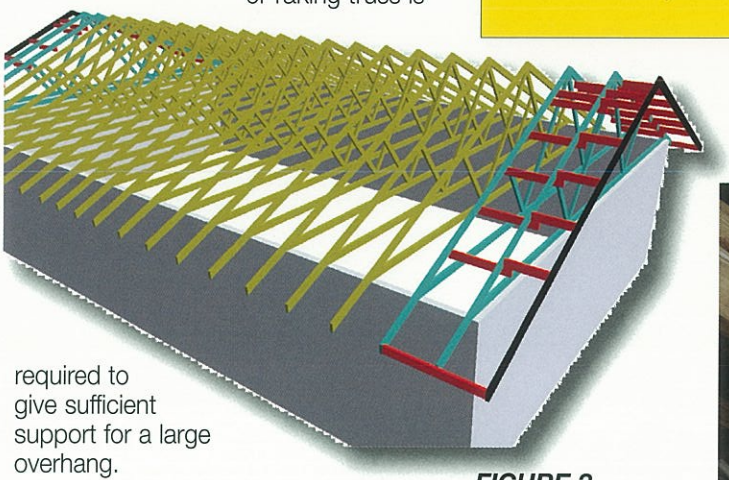

FIGURE 3 "Gunstock" or Z-Sprocket method.

The overhang corner (Fig 6) is the area most prone to complaints of deflection and so requires careful design of all supporting elements.

It is surprising how often building designers combine large verge overhangs with large eave overhangs without understanding the likelihood of problems.

Perhaps it's because in neither the end or side elevation drawings of a house, is the adjoining overhang clearly seen.

The barge rafter, at the end of the verge overhang (shown black in Fig 3) needs to span from the last verge overhang to the extreme fascia line.

Similarly the fascia (shown red in Fig 3) has to span from the last truss overhang to the end of the barge rafter.

FIGURE 4 Z Sprocket Support.

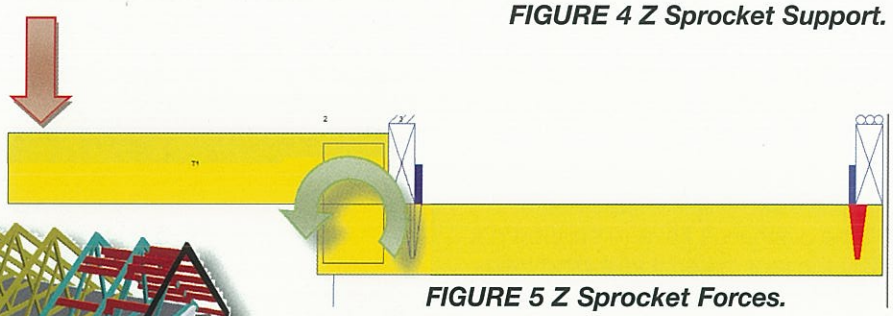

FIGURE 5 Z Sprocket Forces.

FIGURE 6 Corner Overhang.

These two timbers transfer the forces back out to the truss overhangs and the verge overhangs.

It is generally assumed that, because the truss overhangs are stiffer than the verge overhang, the fascia supports the barge rafter.

A non-structural fascia in this situation would require a much stronger barge rafter and verge overhang, and is not recommended.

Obviously the connection between all these elements is critical to carry through the design theory in practice - the construction pitfalls and tips will be covered in Part 2 of this article.

A Gable end is quite a complex system to get right. With correct design and careful construction the result will be safe, strong and look just the way the owner wants. TTN