Gang-Nail Guide Lines No.22

ARE YOU COPING WITH WIND?

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Of late, there has been a lot of discussion and some confusion about Truss Holddown and House Bracing to resist wind forces.

I thought it would be worthwhile to put some things in perspective, as there is a general lack of understanding about wind forces.

The danger in being conservative, to compensate for lack of understanding, is that the results may be unnecessarily expensive or complicated.

So how much wind is really enough?

Let's get to something we understand - news reports are always in km/h.

To convert from m/s to km/h simply multiply by 3.6 and the standard domestic Design Wind Velocities are shown in Table 1.

TABLE 1

Design Wind Velocity (m/s)	News Report (km/h)
28	100.8, say 100
33	118.8, say 120
41	147.6, say 150
50	180.0, say 180
60	216.0, say over 200

Just think back to the last major windstorm event you heard on the news and see where that fits.

Remember too, that the news reports measure the wind up above the housing and the winds experienced by the structures are much lower due to obstructions by landscape, trees and other buildings.

It is the wind velocity at eave level that we design to resist.

Before you go building houses to W28 though, be aware that the wind 'event' we have to design for is a 1 in 50 year storm.

So don't think back a couple of years, consider the worst storm that your parents can remember.

So why not be a bit conservative?

Surely the increase from 33 to 41 m/s is only a 25 per cent increase and the timber sizes and grades are not all decided by Wind loads alone.

The answer to that lies in the conversion from a wind velocity to a force, and that is what the structure has to be designed to resist.

The way this is done is to **square** the wind velocity and apply a whole bunch of factors. So lets compare 33m/s to 41m/s - squaring both gives an increase from 1089 to 1681 an increase of 54 per cent!

That is significant.

Consider then what occurs when a conservative specifier could have used W28 and specifies W41 instead - an increase of 114 per cent - more than double!

This goes a long way then to explaining why the requirements for holddown and bracing are so much higher for W41 than W33 or W28.

Now the big question - whose responsibility is it to set the Design Wind Velocity for a building?

Many would argue that the Council knows the area so they should set it.

Others would say that the fabricator has to detail the frame so they should set the wind velocity and design the bracing to suit.

In most cases Council will not wish to take legal responsibility for making that call in case there is a problem in the future and they become liable.

In some cases Councils have engaged the services of professionals to create a 'Wind Map' which the builder can get the value from.

From Council's viewpoint the responsibility is then in the hands of the professional.

The fabricator does not decide any other design input, such as roof material or pitch and is not always within reach of the site anyway so cannot be expected to know the lay of the land around the site.

The price of a structure will vary in some circumstances with the choice of Wind Velocity, so the builder may not get what he really wants anyway.

Therefore it falls to the building 'designer' to specify the Wind Velocity.

This could be the builder, architect, engineer, design draftsman - whoever is responsible for setting the building specifications.

There are a couple of obvious reasons for this.

Firstly they are the most likely people to know the site and its surrounds.

Secondly they should **set all** the parameters to which the house is to be designed, so the option of how conservative to be is theirs, and the house will cost accordingly.

A good spin-off from this method is that the bracing could also be designed by the building designer, which will alleviate the problem of unbraceable buildings *(discussed in earlier **Gang-Nail Guidelines).***

The designer has the authority to move walls and change windows as necessary to get the required bracing into the building.