

# Gang-Nail Guide Lines No.30

## TIMBER DESIGNERS MUST NOW USE LSD



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Although baby boomers from the psychedelic era may be disappointed to learn this has nothing to do with a certain recreational pastime, it nonetheless promises to become just as habit forming.

Limit state design (LSD) has replaced working stress design (WSD) as the accepted method of timber engineering. Hereafter, Australian timber building designers will have to use this new approach to satisfy the building code.

In reality, the "trigger" will be pulled when a newly revised AS1684 - National Timber Framing Code, expected by the end of 1999, is released.

This timber framing code has been re-written with input from various sectors of the building industry including timber councils from the different states.

It will replace the Timber Research & Development Advisory Council (TRADAC), Timber Promotion Council (TPC) and NSW timber framing manuals. This new code is divided into 4 basic parts: - (I) Design considerations for engineers; (II) Basic low wind house; (III)

Houses in non-cyclonic areas; and (IV) Houses in cyclonic areas.

Depending on their regional location, most truss designers would require only one or two of the volumes, typically parts III and/or IV. However, they contain span tables only for the most commonly available timber grades.

Additional supplementary tables may be obtained for other timber species and grades. Alternatively, a CD containing software that covers the complete range of timber types and applications will also be made available at the time of release.

The most glaring change that designers will notice is that the loads and stresses now appear much larger than before. This is because we are now considering the upper limit of loads i.e. loads that could be expected to cause failure rather than conservative safe working loads.

On the other side of the equation, we are applying a safety factor to the applied load. This results in a more consistent margin of safety on the structure.

As an example, LSD design wind speeds are 22% more than WSD values. What was W33 is now 40 m/s, and W41 becomes 50 m/s. This is potentially confusing and specifications will have to be read very carefully to ascertain which values are being used.

A step being introduced in AS1684 to avert this confusion is to adopt AS4055 terminology for the wind areas such as N1, N2, etc. for different non-cyclonic

wind speeds and C1, C2, etc. for particular cyclonic wind speeds. As an example, N3 will represent the old W41NC and the new 50 m/s non-cyclonic.

Furthermore, product load capacities appear much higher under LSD than before. However, users should beware that they cannot use them in conjunction with WSD forces, as the two systems should not be mixed under any circumstances for obvious reasons. These increased load capacities are only to be used for LSD factored loads.

Another impact that AS1684 part (I) has on truss and framing design is in the tightening of allowable deflections. In particular, conventionally framed hip end



rafter spans have been trimmed.

Truss tie down also show an increase in requirements mainly in the low to moderate wind zones. By contrast, where material strengths govern under gravity loads, LSD generally results in lower grades and sizes. However, roof bracing remains unaffected.

In general, the nett result for timber trusses and frames designed using LSD should remain very close to those obtained/ designed using WSD.

Old WSD	W28N	W33N	W41N	W50N	W41C	W50C	W60C
New Zone	N1	N2	N3	N4	C1	C2	C3
LSD speed	34 m/s	40 m/s	50 m/s	61 m/s	50 m/s	61 m/s	74 m/s

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