GANG-NAIL GUIDELINES No.160

MiTek

ANOTHER MITEK ADVANTAGE

A "MASTER-CLASS"

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The Building Code of Australia classifies buildings into groups according to their use for the purpose of defining performance specifications.

This includes structural as well as other requirements such as fire resistance, sound treatment, access and egress and many others, even parking ratios. These building classes are illustrated below.

The more stringent classes 2 to 9 are covered in Volume One while the requirements for houses and non-habitable buildings, classed 1 & 10, are described in Volume Two.

The requirements are tougher in Volume One as these buildings affect more people using them and are usually more complicated, thereby requiring more skill to construct, whereas houses are built to well-honed traditional practices with plenty of conservative measures already built in.

A timber designer is usually concerned about "Consequence of Failure" (see Guideline 25) where buildings are classified as houses, structures other than houses (typically commercial and industrial buildings) or post-disaster/essential service structures (hospitals, fire stations, etc.)

The intent is that the more significant a building is to the community, then the higher the consequence of failure and therefore a higher safety margin is desirable for the design of any primary (critical) elements, such as girder trusses.

By contrast, house construction and secondary elements have more redundancy – there is load sharing between elements so that those nearby individual weaker ones can help "take up any slack".

Two examples of secondary elements are standard trusses and common studs.

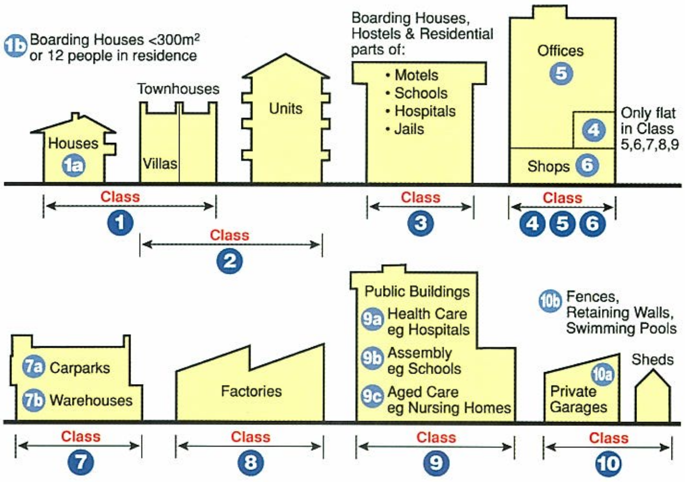
Building class is linked to the "Consequence of Failure" in that a "house" is pretty much a building of Class 1, 10 or (in most cases) 2.

The others are "structures other than houses", some of which may also be "post-disaster or essential service" structures.

The first point to note is that building class and "Consequence of Failure" have major influences on structural requirements:

- Building class affects the magnitude of roof live load
- "Consequence of Failure" determines safety margin for timber, nailplate and connection (e.g. bracket) design

Classes of Buildings



- Applicability of some standards primarily intended for houses, such as AS1684 and AS4055

Building application and floor use can have a significant impact on floor loading. A floor truss in a house is required to support 1.5kPa or 150kg/sq m of temporary (live) loading.

The same truss in an office building (Class 5) under a storeroom must withstand 5kPa, or roughly half a tonne per square metre!

The second point most software users have already observed is the design differences in major trusses depending on the application.

A truss may design easily when it is part of a house, but the same truss with identical loading may badly "fail" design when re-classified as a post-disaster structure.

To clarify that emotionally charged term, "failed" – the fact that a particular size or grade of timber fails in design does not necessarily mean it will break and collapse in use.

If that were the case, then that piece of timber would have to somehow "know" it was part of a girder truss in a school hall say, to suddenly go "weak at the knees"!

A better description might be that the timber size or grade failed to meet the safety margins required for that application.

The third point is one often missed by specifiers: connections supporting critical primary elements require higher safety margins.

Manufacturers of Engineered Certified connectors have literature describing how to modify design capacities in these situations.

The advantage of using truss software to design connections is that the appropriate adjustments will be automatically made whenever necessary.

Manufacturers of "bent pieces of metal with holes in them" who make no claim on their product's capacity do not pay heed to these requirements.

The final point is that higher classes of buildings may require engineering design and/or installation certification because of their importance. This should be spelled out in the contract documents.

It is vital to understand the building's use right at the start of the design process. Take time to confirm it if it is not readily apparent; never ASSUME!