FTMA TECH Talk

pryda

AUGUST 2018 - NO.4

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LIMITATIONS & DESIGN RESPONSIBILITIES OF THE TRUSS FABRICATOR

With the increasing complexity of architectural designs and engineers pushing the limits of truss technology, the good old truss fabricator is being made to take on more responsibilities in the overall design process. As our software progresses into whole-of-house design methodology, we must be mindful that users are not left behind with respect to their limits and responsibilities, not to mention on-going training to undertake more complex designs. This article will aim to discuss just a few of the many topics which have been the cause of confusion or misconceptions amongst the industry.

Fig. 1 - Two storey dwelling with 40 deg. roof pitch

Design responsibilities: Guidelines to clearly differentiate between design responsibilities of the engineer and truss fabricator is not something we have defined in our industry, or in legislation. The closest documentation would be the ABCB Protocol for Structural Software, which originated from South Australia to assist with the approval processes when designs are produced through structural software without engineering supervision. This protocol, while bound by the same limitations as AS 1684, AS 4055 and AS 4440, provides little guidance on exceeding these limits or responsibilities of the various parties involved in the process, nor was it intended to cater for this purpose.

In contrast *ANSI/TPI 1 – National Design Standard for Metal Plate Connected Wood Truss Construction*, a U.S. industry standard which is referenced in their building codes, provides a comprehensive outline of responsibilities between all relevant parties from the Building Owner, all the way through to the Truss Designer and Fabricator. This ensures that there are no grey areas and each party understands where their liabilities and responsibilities lie. Our industry appears to be slowly moving in the same direction with the introduction of Australian Standard *AS 1720.5 – 2015 Timber Structures – Nailplated timber roof trusses,* which is now referenced in the NCC. This standard expands on the AS 1720 series as a natural progression to a suite of timber design standards, but at this stage the main focus is related to design considerations and methodology of timber roof trusses whilst a similar outline of responsibilities has yet to be implemented.

Limits of AS 1684, AS 4055 and AS 4440: The more commonly known limitations of these standards are shown in Fig. 2, typically applicable to Class 1 and 10 structures. These, and many other limits, are to ensure that these standards and any supplements can be utilised by the building industry without the input of a registered engineer.

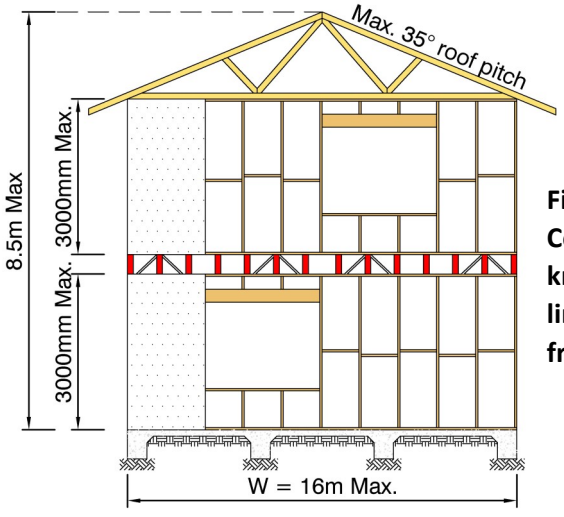

Fig. 2 Commonly known limitations from AS1684

So, what are the implications for the truss fabricator when undertaking projects beyond these limits? The short answer is that span tables and specifications within these standards cannot strictly be relied upon, which is less of an issue these days since reliance on these methods are being replaced by specific software designs. The long answer is more involved and hence where most issues arise. These standards *can* apply to projects exceeding some of these limits, even light commercial structures, provided an assessment of suitability is made.

So, who is responsible for this? The ideal candidate would be the building surveyor but is generally not the case due to liability reasons, so the next obvious candidate would be the consulting engineer, if one is engaged for the structural framing on the project. However, the trend for builders to reduce costs has resulted in engineers mainly focusing on civil or footing designs while passing the structural framing to others – and we all know who this ends up being!

Fig. 3 - Three Storey Class 1 & 10 Structure

Potential outcomes: As a truss fabricator, what can you potentially expect when you produce designs beyond these limitations and responsibilities? You may be thinking to yourself, "I've come across this many times and never had an issue" and you may well be right. This grey area, fuelled by different practices between states and territories, creates all sorts of challenging scenarios to overcome. Where an engineer provides all the relevant designs and specifications there would rarely be any issues, unless the fabricator chooses to vary or substitute these designs without prior confirmation. More often, issues arise when the fabricator is forced to undertake the structural framing without realising they are in the grey area, the result of which is usually identified after the framing is installed and being inspected. On many of these occasions, the surveyor may request that the project is reviewed and certified by a registered engineer. This often comes at an additional cost, with delays on site and even remedial works. Therefore, it would be advantageous to tackle these issues early on, even at estimating stage if possible, to ensure you are not caught out later in the process. Talk to your builder and their surveyor or engineer for clarification if at all possible, otherwise consult with the engineering team from your nailplate supplier to ensure you understand all the potential ramifications of designs which exceed the code limits.

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