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GN GUIDELINES NO.226

ANOTHER MITEK ADVANTAGE – MAY 2016

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Requiring accurate installation

Some detailers are fond of equally spacing trusses at an odd dimension, purely to make their truss layout look more even. The question is then whether the builder will mark the top plates at the design spacing or at the nominal default spacing.

Take for example, a roof with a 4.0m long ridgeline. The trusses may be set out at 600mm centres from each end with a pair of trusses spaced at 400mm in the middle to make up the residual distance, or they could all be equally spaced at 560mm along the full run. The traditional method using legacy software would be to conservatively design all trusses with a 600mm strip load, irrespective of the actual spacing. In that situation, it doesn't matter where the builder locates the trusses, and where he positions the odd truss spacing, as long as none of them exceed the nominal 600mm spacing. The supporting wall frames (especially top plates and lintels) would also be simplistically designed to support the roof load width without any regard for truss locations.

Next generation design software has now advanced towards designing a complete building holistically, using three dimensional analysis to transfer the loads, instead of designing each component in isolation. Roof and floor trusses and joists are no longer designed on assumed spacings, but on loads accurately based upon actual spacing in accordance with the building model that has been created by the user. The supporting elements are also designed with precise point loads calculated from the load path, instead of approximating roof and floor load widths (see Figure 1, below).

By applying finite element principals similar to other structural software that professional engineers use, modern truss building software is effectively using a similar design process as those used in the commercial sector, and applying it to residential structures. By utilising specific load transfer and analyses, the design solutions are more accurate and more cost efficient than any legacy software.

Under the ACBC Software Protocol, a detailer is obliged to provide all necessary installation details to the builder on site. Clause 3.1 in AS 4440 states that: "A layout with sufficient information to correctly locate the timber trusses shall be provided prior to the installation." This includes any specific assumptions they have made, including a dimensioned drawing of the truss layout

My observation of current practices tells me that detailers usually highlight over-spaced trusses (eg, 605mm centres) by marking them clearly on the layout. With the sophistication of modern software, it's equally important to also highlight any truss spacing that's less than the nominal default (see Figure 2). Ideally, the location of every truss on the frame, no matter the spacing, should be clearly defined. This is a timely reminder to the installer that it's also important to accurately follow the detailer's truss layout drawings on site. It's no longer satisfactory to just "follow your nose" when placing trusses on the walls.

Design methods have evolved and become more refined and accurate. Design standards now use ultimate limit state instead of working stress design; timber grading is scientifically processed into MGP grades instead of F-grades; building codes and standards contain much more detail than previous editions.

It's no longer acceptable to "guesstimate" design and construction with outdated rules of thumb. Builders and suppliers alike have to take greater care and responsibility for their work by following specifications with due diligence. T

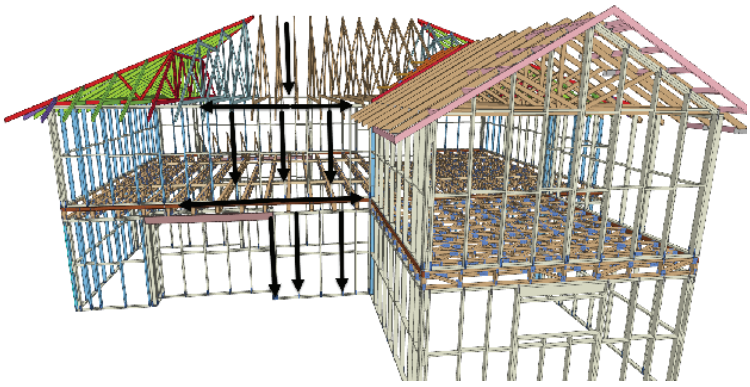

Figure 1. Direct load transfer through a 3D model

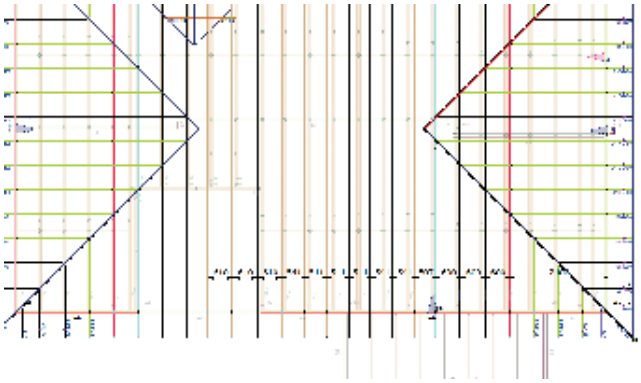

Figure 2. Obligation to show under- and overspaced trusses

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