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Mishandling asymmetrical trusses

A significant number of requests have recently been received by our design office regarding rectifying trusses that have been installed back-to-front or left-to-right.

A fully symmetrical truss – one that is identical back-to-front in every way – is not affected by the way it is installed. However, an asymmetrical truss – one that is not exactly identical on both sides of the centre line – must be installed in one particular orientation.

Once all trusses are fixed and braced it may no longer be possible to turn it around and an engineer has to be called in to fix the careless placement.

ASYMMETRICAL TRUSS CHARACTERISTICS

How can a truss be considered non-symmetrical if the external shape is clearly symmetrical? There are several possibilities that usually stem from the fact that either the truss is not uniformly loaded across its entire span, the web layout is deliberately skewed to accommodate services, or the support points are unevenly located.

In the first case some girders are designed to support irregular loads from other trusses, beams or services such as air conditioners, heaters, or solar hot water systems. This leads to the second case

where the web layout is modified to create a void for positioning the heater unit or ductwork. Examples of the third case include internal supports and cantilevers that are not identical on both sides. These cases result in truss components that are not identical on both sides of the centre line.

THE PRESCRIPTION

Rectifying trusses installed the wrong way around can be challenging, particularly if access is difficult or if the roof is fully loaded and deflected, or if crude attempts at a 'site fix' have already been made.

In detailing this type of rectification, the entire truss needs to be considered and not just the affected area. Every stick of timber and nailplate has to be examined. Even if a nailplate is of the correct size, its orientation or alignment may be different (refer to GN Guidelines 169) and would therefore still require rectification.

PREVENTION IS BETTER THAN CURE

What is even better than fixing a problem? Preventing it from happening in the first place. But how do we go about doing this?

Truss suppliers normally label all trusses and mark their locations on a truss layout. On top of this, asymmetrical trusses should have

additional labels or markings on them to denote the locations of service loads, internal and cantilever support points, tie downs, and bracing for the installer to follow.

In the production plant it would also be very helpful if trusses were stacked in the reverse order, and in the orientation they are expected to be installed, before they are loaded on the truck. It means additional effort is required during stacking in the factory and when organising a logical manufacturing sequence, but it would make a significant difference to the installer.

The coordination also extend to the truck driver, who must place the stacks the right way round on the structure, as it would be extremely awkward for the installer to have to turn the trusses around once they are on the wall.

For their part, installers should always pay attention to the truss layout drawings and all markings and labels on trusses, especially those that indicate special load points or supports.

It all comes down to good planning and attention to detail, not just from an individual, but from everyone.

In the instance that Murphy's Law prevail, avoid makeshift rectifications on-site and contact your truss engineer for immediate assistance. **T**

