GANG-NAIL GUIDELINES No.108

ANOTHER MITEK ADVANTAGE

LATERAL RESTRAINTS?

Lateral restraints are an essential part of any roof bracing system and are possibly the least understood bracing requirement.

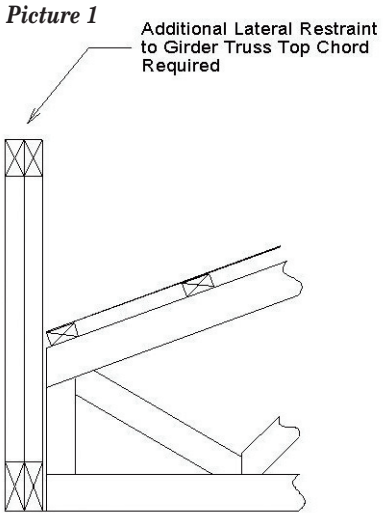
By DEAN ASHTON
State Engineering Manager, Victoria
MiTek Australia Limited

Why do we need to laterally brace trusses and frames? The simple answer is to provide a safe and stable structure. In engineering terms we use lateral braces to hold the trusses and frames straight and plumb so that they maintain their structural integrity.

Lateral loads can develop due to a number of external factors such as wind forces, or in certain areas due to earthquakes, or they may develop internally by the structure itself.

Whenever a member is subject to compression forces there is a

Picture 1



tendency for the member to buckle sideways.

The longer the member, and the more slender the member, the greater the tendency to buckle. Lateral restraints prevent sideways buckling and hence increase the capacity of the member to carry compression loads.

Top chords of trusses and some webs are subjected to compression loads under the gravity load of roofing, ceiling and self weight. Therefore it is very important that the lateral restraints assumed during their design are in fact provided during installation.

Roof truss top chords are typically laterally restrained by roof battens. However some roof trusses, e.g. trusses supporting valley trusses, do not get fixed directly to the roof battens. In these cases you need to take extra care to ensure that the assumptions your truss design software is making about restraints is practical.

Picture 2

■ *Furring channels supported by clips do not restrain bottom chords*

Truss designs will nominate which webs require lateral bracing. Not all webs require lateral bracing so it is important to place *'Brace Here'* stickers on webs during manufacture so that it is clear to the truss installers where braces are required.

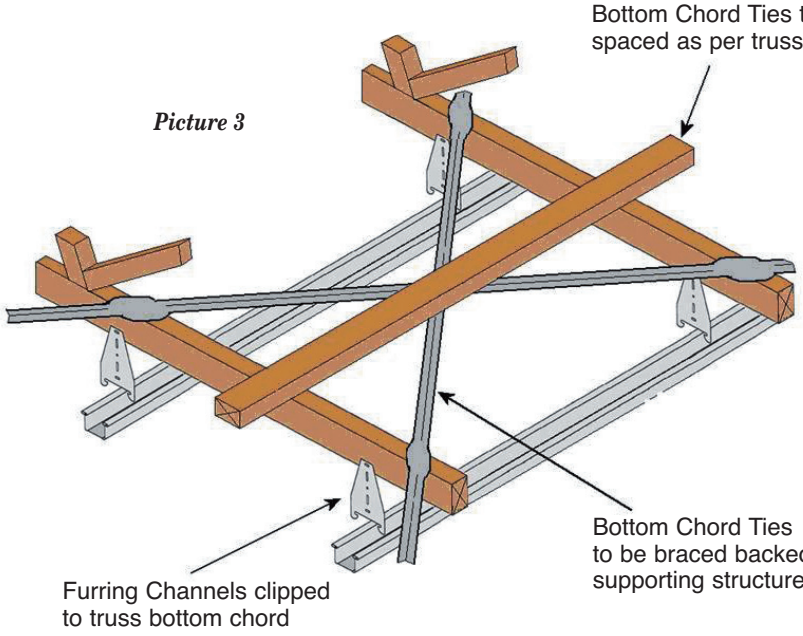
A truncated girder truss will have the horizontal top chord restrained laterally by the jack truss or rafters. AS4440-2004 has hip end fixing details that show framing anchor fixings to the horizontal top chord.

These framing anchors are not just for hold down, but also to ensure that the horizontal top chord is adequately restrained against lateral movement.

I have seen jobs where the horizontal top chord has bowed severely away from the jack trusses because the framing anchors were not used.

Recently I had a job come across my desk where they wanted to use a parallel girder truss to form a parapet (see Pic 1). As there were no overlying members, to provide lateral restraint, we had to use a large

Picture 3



Continued overleaf

LATERAL RESTRAINTS? . . . *continued*

stiffening member on flat to form a 'T' section.

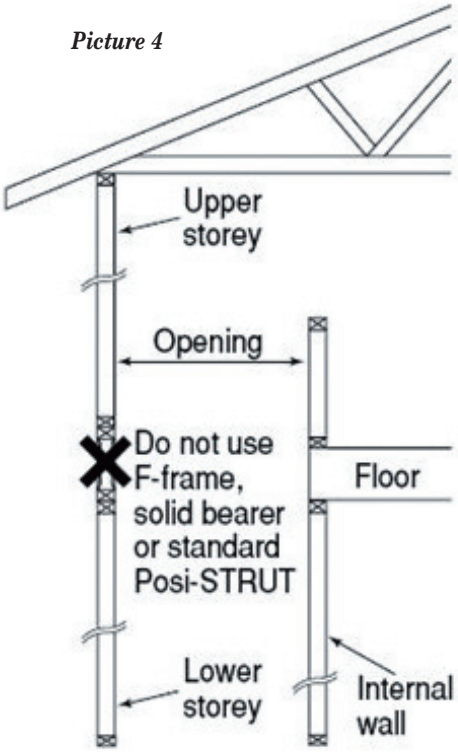
Similarly the bottom chord is typically restrained by ceiling battens, or in the case where the ceiling is fixed directly to truss bottom chord, the ceiling material itself may act as a diaphragm to restrain the trusses.

Care needs to be taken with ceilings that are installed using metal furring channels as furring channels that are clipped to the truss will not provide restraint to the bottom chord (see Pic 2).

This also applies to trusses with exposed bottom chords or suspended ceilings and additional restraint and bracing may be required.

In addition to restraining the truss bottom chord, AS1684 allows wall bracing loads to be transferred through the ceiling diaphragm, so it is important in cases where the ceiling is not effectively fixed to truss bottom chords that bottom chord bracing is installed (see Pic 3).

Picture 4



Another area where lateral restraints are often overlooked is in two storey construction where there is a stairwell opening adjacent to an external wall.

As there is no connection between the wall and the floor in this area, there is no lateral restraint to the walls. In these circumstances special internal beams are required (see Pic 4).

If you are not sure how a truss or frame is to be laterally restrained contact the engineering department of your nail plate supplier. TTN