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ANOTHER MITEK ADVANTAGE – JULY 2014

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PLAN FOR AIR CONDITIONING!

Have you ever come across a newly sealed road that is being excavated for underground services almost as soon as the road works are complete?

It is flabbergasting why they could not have scheduled activities in the right order.

A repaired road surface is neither as good nor as durable as the original, just as a retread tyre is never as good as a new one.

So I am baffled why this engineering office constantly receives requests to modify recently erected roof trusses to retrofit ducted air conditioning units in the roof space.

Where in the planning process has it gone wrong?

WHAT'S THE PROBLEM?

The dimensions of an indoor fan unit (typically around 0.4m high x 1.5m long x 0.9m wide) are usually too big to fit between 600mm standard truss spacing and too large to fit within normal web layouts in shallow roof trusses.

This means that some unfortunate trusses have to have their infringing webs removed.

As soon as that happens, the trusses lose some of their load carry capacity and stiffness, resulting in a localised structural weakness being created within the roof.

The reduced stiffness of the affected trusses cause them to deflect and thereby transfers some roof load to adjacent trusses, increasing the stresses in their members/connections and resulting in these neighbouring trusses deflecting as well.

Perversely while these trusses are having their structural integrity compromised, they also have to be stronger than ever before to carry the additional weight of the new unit (typically 60-100kg).

RECTIFYING THE TRUSSES

Depending on how many webs need to be removed to fit the unit, there are two alternative rectification methods a truss engineer may prescribe:

A poorly retro-fitted air conditioning unit.

Option 1: Strengthening the air conditioning truss and adjacent trusses to carry the increased loading. They may also require stiffening to limit deflections within reasonable levels.

Strengthening details typically involve fixing new web members and/or scab members, inserting hanging beams and reinforcing truss joints with NailonPlates.

Option 2: Modifying the air conditioning trusses to be supported off an internal wall, in order to reduce the clear span of the trusses and associated truss deflections.

This option also requires the wall frames below to be strengthened to receive the trusses and is subject to the type and adequacy of the foundation beneath.

Both options require a full truss analysis to be carried out, which involves reviewing all remaining members and joints with the newly imposed loads before incorporating appropriate modifications like additional webs, scabs and bearing points where applicable and re-analysing and detailing.

Sometimes, so many trusses are affected by the footprint of the unit that it is simply not feasible to proceed with a rectification

RECTIFYING THE SOURCE

The cost of any rectification always exceeds the cost of doing it right first time and this holds very true for the retrofitting of air conditioning units.

These avoidable costs and unnecessary waste of resources include engineering fees, materials, labour, downtime and delays.

Surely the true solution to this problem is not to repeatedly rectify trusses, job after job.

I believe that this is not the source of the problem. It is the repeated breakdown in the planning process that has to be solved by finding out where it occurs.

Is it the architect who fails to accurately define the client's needs and incorporate their requirements in the building plans?

Is it the builder who under time pressure chooses to ignore the issue until after the HVAC installer turns up on site to do his work?

Is it the HVAC provider who is slow to indicate their size and weight requirements for design?

Is it the truss detailer who does not ask relevant questions when a unit is vaguely shown dotted in the plans without dimensions or weight specifications?

If we are to be professional and the best in our business, we have to be concerned. TTN