

Ref:15028  
6/10/17

Emma Scragg Architect  
62 Agnes Street  
Auchenflower 4066  
QLD

E: [mail@emmascragg.com](mailto:mail@emmascragg.com)

**RE: STRUCTURAL REPORT FOR NINNEY RISE**  
**#405 ALEXANDER DR ESPLANADE, BINGLE BAY, NTH QUEENSLAND**

Dear Emma,

At your request we carried out an inspection to the above property on 16/8/17. The aim of our inspection was to note any major structural defects in the buildings at the above address.

Enclosed in this report are a number of photographs we took while on the site with you. We will refer to these photographs in the text of this report. They are numbered DSC 0012 – DSC 2685 and IMG 9009 - IMG 9017.

1. DSC 0012 – 17 are of the ceiling space when viewed through the man hole in the bath room to bedroom 1 at the SE end of the building. These photographs show a conventionally pitched roof with joists, collar ties, purlin props and hanging beams. There was no obvious damage to the timber sections able to be viewed. There were no visible tie downs to the roof structure. The roof members were nailed and not screwed, as was typical of buildings of this vintage. The pitch of the roof was approximately 20 degrees to the horizontal.

Insulation with bitumen building paper to the underside of the roof insulation has been placed to the underside of the roof and on the ceiling. This insulation and building paper showed signs of deterioration.

2. Photos DSC 0018 & 0023 show Bedroom 1 and kitchen at the North Eastern side. The internal room has ceilings which are constructed from Bamboo and the kitchen ceiling is timber panelling. The bamboo ceilings occur throughout the house and are in reasonable condition, however some repairs may have to be made where deterioration is obvious.
3. Photos DSC 0028-0033 are of the 2-story section to the Northern end of the building - Bedroom 5 and bathroom, passage way and stairs. This section is conventional construction and appears to be in reasonable condition.
4. DSC 0035 - Servery
5. DSC 0036 - Verandah to eastern face of the building.
6. DSC 0037 – 0045 - Edges and underside of the verandah to the eastern face.
7. DSC 0047 - NE corner of the above verandah.
8. DSC 0048- Stairs from the East to Eastern verandah.
9. DSC 0049, 0050 - Eastern verandah.
10. DSC 0051 - Ceiling of the Eastern verandah.
11. DSC 0052-0054 - Two storey section on the Northern end of the building
12. DSC 0055 - Tiles on the Eastern verandah.

13. DSC 0056 - Shows damage to the bamboo ceiling in one area.
14. DSC 2685 - Shows deterioration of the concrete verandah slab from the rusting of reinforcing.
15. IMG 9009 -9012- Shows roof which appears to have been replaced after cyclone Larry or Yasi. Roofing appears to be new colorbond custom orb with cyclone washer assemblies throughout.
16. IMG 9013- Bracket for support beam to verandah.
17. IMG 9014- Northern 2 storey section eave.
18. IMG 9015 - NE corner Eastern verandah.
19. IMG 9016 & 9017 - Under southern ground floor timber joists and bearers.
  
20. The Western stair with the large visible crack is probably a shrinkage crack that has lead to reinforcing rust in the slab. There appears to be no step in the top of the treads, so it would appear that the slab has not settled.
  
21. The crack in the underside of the verandah slab and the stair crack could be treated as per "observations of the structure". I think a drip line may not really achieve anything as the rusting is due mainly to air laden moisture.
  
22. The crack in the top ring beam could be treated in the same way as could the spalling brickwork. As you have indicated, the concrete mortar joints are stronger than the bricks. The only other way is to replace the bricks that are spalling.
  
23. Re-pointing with lime mortar is a mammoth job and it would be better to replace the odd spalling brick.
  
24. As indicated there is obvious cracking to the under-side of the slab due to reinforcing not having sufficient cover when the slabs were poured.

### **OBSERVATIONS OF STRUCTURE**

The main areas of deterioration of the structure appear to be on the Western, Southern and Eastern verandah concrete slabs. This is due mainly to rusting of slab reinforcing. This rusting has resulted in spalling of the underside of the concrete slabs. This rusting of reinforcing may have been due to insufficient cover to the reinforcing when the slabs were poured.

The rusting and spalling could possibly be delayed by the use of water based epoxy injected into the cracks then coating the underside of the slabs with water based epoxy and an acrylic based top coat. It may be possible to spray these coats as it is over head. Any spalling concrete can be removed and the exposed reinforcing painted with phosphoric acid and then irrigated and thoroughly dried before re-rendering using water based epoxy and subsequent top coats.

This technique for treatment of the slabs and reinforcing will tend to delay further degradation of the reinforcing and the slab. It will not however fully prevent further degradation. The verandah slabs may have to be replaced eventually.

The following technique as described in 'Concrete Technology & Practice' – written by W.H.Taylor; pg. 306-307, could be useful as a reference for sealing cracks:

*'(b) Sealing of Cracks*

*Small cracks are primed with acetone and sealed with an injection of low-viscosity epoxy resin and hardner. A cake-icing gun or hypodermic syringe with an 18-guage needle, or caulking gun with a disposable plastic cylinder and nozzle may be used. Large cracks are primed with epoxy resin and hardner (in the proportions of 3:1 by volume), and filled with a trowellable epoxy mixture or paste. Deep fissures may be filled by pressure-grouting methods, using pressure nipples that are inset at 2-ft to 4-ft intervals, a vented surface seal and a lever-operated grease-gun or a pneumatic extrusion gun (50 to 110 lb/sq.in.). Sand, cement or pigment may be trowelled or brushed into the unhardened resin. Movement fissures may be sealed with an elastomer, such as a silicone latex compound.'*

Deterioration of bamboo and internal finishes should be subject to an ongoing maintenance program.

## CONCLUSIONS

In general the building appeared to be structurally sound apart from deterioration of reinforcing on the veerandahs.

What is not clear however is that the roofing appears to have been replaced after the two cyclonic events: Larry and Yasi, but it appears as though the supporting structure roof beams, purlin props, tie downs, etc. have not been upgraded at the same time that the roofing was replaced. This is most unusual as the normal rules are if you replace more than 25% of the roofing that the substructure has to be upgraded as well. If possible, further investigation into what was actually replaced/ repaired after these Cyclones should take place.

Should you require any further information please contact us



Peter Lennox  
RPEQ 1128

