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LOCAL GOVERNMENT NEW ZEALAND TECHNICAL ASSISTANCE FACILITY

Tokelau

Building Control

25 August – 11 September 2019

This report has been prepared by Peter Burnet, Principal Technical Lead, with the assistance of Mark Fitzpatrick, Assessor Building Control Officer at Wellington City Council, after a visit to the atolls of Nukunonu and Atafu, Tokelau, from 25 August to 11 September 2019.

This report is the opinion of Peter Burnet and Mark Fitzpatrick. It should be used in conjunction with other reports and information and does not necessarily reflect the views of Local Government New Zealand, Wellington City Council, or the Ministry of Foreign Affairs and Trade.

We would like to acknowledge the assistance of the Taupulega of Nukunonu and Atafu, and in particular Tumua Pasilio and Vesesio Wright, for their assistance in Nukunonu, and Mika Kalolo in Atafu, and the villages of both atolls for making us feel very welcome.

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PacificTA is funded by New Zealand Foreign Affairs and Trade Aid Programme

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Summary findings and recommendations for Nukunonu and Atafu

1. Apply the requirements of the Building Regulations 2007 (BR07) to get a better quality of building: http://www.paclii.org/tk/legis/consol_act_2016/br2007140/
2. Undertake building inspections on all building projects as set out in Section 8 Building Rules 2007.
3. Obtain copies of the Tokelau home building manual, volumes 1 and 2, and make them available in both hard and electronic to the three Councils, to assist in quality of building.
4. Review procurement tendering process for building work – will help with getting a better building product.
5. Undertake programed maintenance on public buildings to extend the life of buildings.
6. Engaging a structural engineer to assess the Motuhaga Bridge and other existing public buildings that are showing signs of structural failure.
7. Improve storage of all building materials.
8. Put water tanks under test as per Section 8 Building Rules 2007, and make them accessible to allow for any future maintenance.
9. Stainless steel fixings to be used due to high corrosion conditions on the atolls.
10. Smoke alarms to be installed in buildings containing sleeping accommodation.
11. Sill blocks should be used in any future blockwork buildings as per Figure E3.15 Tokelau Home Building manual Vol2 (head, jamb & sill all to be rebated).

Further recommendations specific to each building that was inspected are included in the main body of this report.

1. Introduction

Local Government New Zealand approached Wellington City Council (WCC) Building Compliance and Consents to assist with the Pacific TA programme to support the Taupulega (Council) of Tokelua with their building control activity and building inspection capability. Two of the three atolls of Tokelau, Nukunonu and Atafu, were scoped and provided recommendations to improve the quality of buildings and identify areas of potential failure.

As part of the review, Peter Burnet and Mark Fitzpatrick from WCC building visited Nukunonu and Atafu between 24 August and 10 September, undertook inspections of a number of buildings and met with the officials from the Taupulega of Nukunonu and Atafu.

2. Building Rules 2007

The Building Rules 2007 set out the legislative requirements for building control in Tokelau. Section 4 of this document referred to the Building Code. It became apparent that the officials we met had no knowledge of the regulations or building code, and as such were failing to meet the requirements set out in them.

Link to Building Rules 2007: http://www.paclii.org/tk/legis/consol_act_2016/br2007140/

Recommendations

1. The requirements of the Building Regulations 2007 are upheld, as this will assist in improving the quality of building in Tokelau. At the very least a building committee for each village is established, to meet the requirement of section 5 and ensure that the inspection condition in section 8 is applied to every permit issued.
2. Each atoll should also obtain copies of the Tokelau home building manual, volumes 1 and 2, in both hard copy and PDF. Copies can be obtained from City Print Communications Ltd. Contact Darrell Peebles, senior account manager, phone: (04) 473 8885, City Print House, 25 Bond Street PO Box 24 056, Wellington, New Zealand.

3. Nukunonu buildings

Visual inspection of the following building was carried out.

Hospital

In general, this is a well-constructed building and with a good maintenance programme and should provide the people of Nukunonu with a good serviceable building for a number of years.

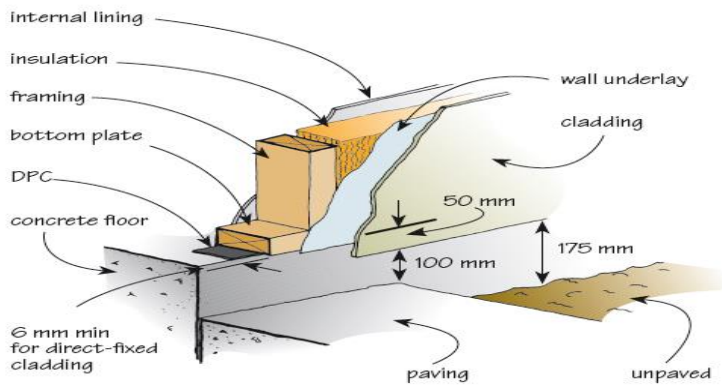
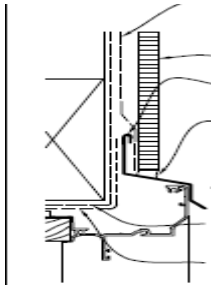
There were some items of concern:

- Fibre cement cladding has been installed with no ground clearance. This has the potential for moisture to be drawn up into the cladding, which can lead to the cladding delaminating.
- Head flashing installations to the aluminium windows are incorrect and will not provide the intended protection against water ingress.

A mitigating factor is the wide verandas that provided good protection to the cladding and windows from the weather.

Recommendations

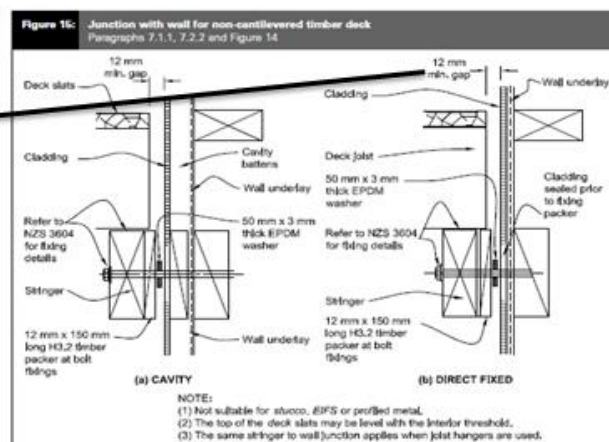
1. Head flashings should be installed, so that the face of flashing fits closely up against the face of aluminium window, as per the figure below.
2. Cladding systems should be installed to meet the requirements of the manufacturer, and this should be documented during the approval stage of the proposed work. As a general rule, cladding should have a minimum clearance of 100mm from a paved area or 175mm from unpaved areas – see figure below.
3. Sill blocks should be used in any future blockwork buildings as per Figure E3.15 Tokelau Home Building manual Vol 2.



Jacinda Ardern Accommodation

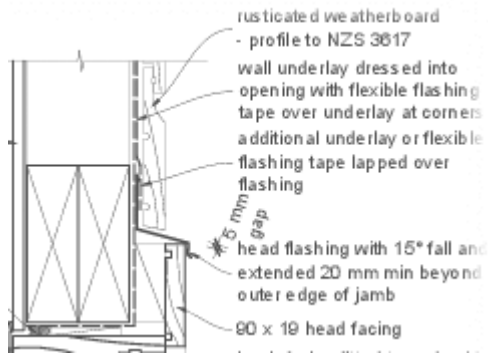
This building was still being completed but was up to a good standard of construction with design features that will provide protection from the weather. Head flashings had not been installed to the windows but this was mitigated by the installation of facings around the window, and the protection provided by the verandas.

The upper level deck has been installed hard up to the cladding. This should have a drainage path (see below photo with detail from the New Zealand building code acceptable solution).



Recommendation

1. Install head flashing as per detail below, or at the very least, in place of a metal flashing, an exterior silicon sealant should be applied to the top the head facing, to provide extra protection. Ensure decks attached to building have a 12mm gap to allow water to drain.



School building

The school has a major weather-tightness issue that causes the building to flood during heavy rain, and has the potential risk of injury to staff and students, from slipping on the wet tiles.

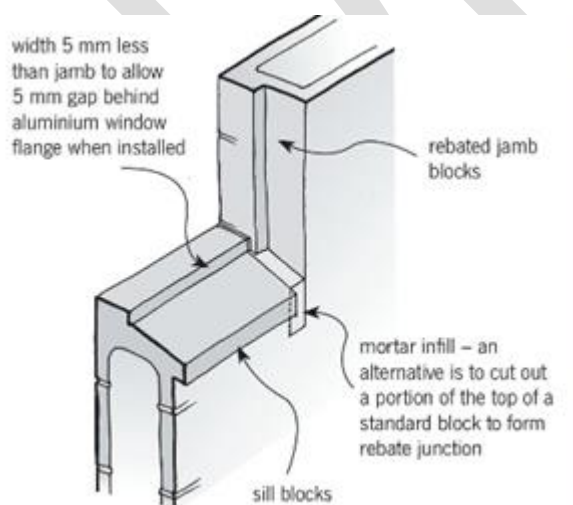
The water tank is also not holding water and as such has the potential to allow contaminated water to enter the tank.

Both of these issues are due to poor design, as there is no protection from the prevailing weather from the seaward facing side of the building, and poor construction methods.

Recommendations

1. Installing window facings and applying an external plaster system, to provide a waterproofing coating to the blockwork, should address/reduce the weather-tightness issue if applied correctly.
2. I would also recommend that the seaward facing side of the building have a veranda installed that mirrors the other side of the building, as this will help protect the cladding system being exposed to water penetration.

Sill blocks should be used in any further blockwork buildings.



School Water Tank

The water tank may be beyond repair, due to the inability to access them safely to apply a membrane to the inside, to address the lack of waterproofing, and the cost involved with this.

Recommendations

1. In future, it is recommended that all tanks are tested, to confirm they are holding water, before they are enclosed. This would involve filling the tanks with water (this could be from the lagoon) and being left for a minimum period of 24 hours. This test should be observed by the building inspector, and be part of the building permit requirements as set out in section 8 of the Building rules 2007.

Solar Power Station

The batteries and infrastructure have been installed in an existing building that has a leaking roof. Solar panels have also been installed on top of the roof, which was not designed to take the weight of the panels and has caused the roof to sag.

Recommendations

1. Repairs are made to the roof to address the leaks and check to see that the fixings for the solar panels have been sealed correctly. Propping and strengthening of the roof to address the sagging be undertaken. In the long-term, the building should be re-roofed.

Generator room

The generator at the time of the inspection was protected by a tarpaulin. This was due to a poorly maintained roof.

Recommendations

1. Maintenance is undertaken on the roof to address the water ingress and consideration be taken to re-roof the building.

Motuhaga Bridge

Structural failure of the bridge is likely, due to the supporting beams suffering from what is known as concrete cancer. Concrete cancer is caused when the steel reinforcing within a concrete slab begins to rust. As the steel rusts, it expands, displacing the concrete around it, causing it to become brittle and crack. The reason for this is generally due to the reinforcing steel being too close to the surface, or poor concrete that has allowed water to penetrate the surface and reach the reinforcing steel.



Recommendations

1. A full structural review is urgently undertaken by a structural engineer to provide a solution to remediate the bridge. In the interim, it is recommended that only light traffic use the bridge.

Government administration building and accommodation on the top floor

This building is in the need of maintenance and a structural review would be recommended.

It is also recommended that smoke alarms be installed in the accommodation area of the building, as currently there are no early warning systems to alert the occupants of a fire.

Recommendations

1. A full structural review is undertaken of the Government Administration building.
2. Smoke alarms to be fitted to accommodation are of the administration building.

Residential Buildings

In general, the older residential buildings are in a poor state of repair and are in need of maintenance. A number of buildings are suffering from concrete cancer and will need to be repaired to avoid structural failure. This would also need to be evaluated by a structural engineer.

The newer builds are being constructed well and the construction methods being used are suitable.

Recommendations

1. Smoke alarms are installed in all residential buildings and as stated above to the accommodation building. Long-life battery photoelectric type would be preferable.

4. Atafu buildings

Visual inspection of the following buildings was carried out.

Matauala School

From a visual inspection, the building appeared to have been constructed to a good standard, but was in need of general maintenance. There are a number of penetrations in the cladding that have not been sealed and this can lead to water entering the building. From having a discussion with the staff, it was established that there are no emergency evacuation drills.

Recommendations

1. A maintenance plan is established to keep the building in good repair and any penetrations in the cladding are sealed with an exterior sealant.
2. I would also recommend that an evacuation drill be carried out annually.

Lomaloma Hospital Atafu

This building is also suffering from lack of maintenance and similar to the school, without a maintenance plan the building will only deteriorate further.

Recommendation

1. Maintenance plan be established for the hospital building.

The University of the South Pacific

This building is in a poor state of repair and is in need of maintenance.

The building is also made up of a number of buildings that have been altered and added to over time. This has led to the means of escape from the building being compromised. In particular, the computer room door is partially blocked by the door leading to the kitchen/canteen area. There was also no evacuation plan for the building.

Recommendations

1. Establish a maintenance plan for the building.
2. Remove the door obstructing the egress route from the computer room.
3. Evacuation plan for the building and an annual drill be carried out, and smoke alarms installed.

Solar power station

This building was in a good state of repair. As with all of the buildings, a maintenance programme should be established.

Matagi Motel

This building has been built to a good standard, although there are some issues with the standard of finishing that have led to the deterioration of some elements in the building. They should be fixed, as part of general repairs and maintenance of the building. There were no early warning systems to alert occupants to escape the building in the event of a fire.

Recommendations

1. Maintenance programme be put in place.
2. Long-life battery photoelectric smoke alarms should be installed in each of the units. These are reasonably priced and have been proven to save lives.



New Administration building

This building, while being 6 months behind the expected completion date, is being constructed to a good standard at the time of the inspection.

It was identified that the concrete at the base of the columns had not been vibrated sufficiently. The site foreman was aware of this and had a plan to remediate the issue.

There also appeared to be a lack of details on the plan and a lot of decisions were being made on site. While this is not a recommended practice, good decisions are being made, due to the experience of the site foreman.

The roof connections were in place that would be expected for a building that will be subjected to extreme winds, however they were not stainless steel, as would be expected due to the exposure to salt spray.

Recommendation

1. Connections for this building are galvanised steel. I would recommend that stainless steel be specified in future, due to the high salt spray the buildings are exposed to.

New office blockwork building under construction

This building is being built to a good standard. This building also did not have stainless steel fixings, which would be advisable to use due to the high salt spray the building will be exposed to.

Recommend use of stainless steel fixings



Recommendation

1. Fixings should be specified as needing to be stainless steel for future builds.

Residential Buildings

There were three new residential buildings under early construction that we observed. All three were not being worked on during our visit. It was noted that the reinforcing steel was showing signs of rusting. There were also materials stored without adequate cover.

Recommendations

1. Any loose mill scale and excess flaky rust should not be left in place and should be cleaned before concrete is poured. Building materials should be covered to protect them from the elements.
2. Reinforcing steel that is going to be left exposed for extended periods of time should also be covered.

5. Water tank issues on Nukunonu and Atafu

It was established that a number of the existing concrete water tanks were failing.

For the above ground tanks, applying a waterproof render coat to the face of the water tank can assist with making them waterproof. There are a number of products on the market and there is a very good YouTube clip (<https://www.youtube.com/watch?v=QpAwd9iCHQ8>) that explains a process on how to go about the repair of the tank.

Any membrane applied should be checked to see that it can be used on a tank that is intended to provide drinking water.

Recommendations

1. I would recommend that a specialist be consulted to provide advice on this issue.
2. Any new tanks should be tested and constructed in a way that maintenance can be carried out on them, and mesh or a grill be placed over the overflow pipes to vermin proof the tanks.

6. Caged sea walls

Sea walls have been constructed using mesh that is not durable and is starting to rust, which will lead to them failing.



Recommendation

1. Good quality stainless steel mesh is used in future if this type of wall is to be constructed.