Water by mivac
Poverty reduction through Water, Sanitation and Hygiene (WASH) Projects

REPORT ON CEILING ISSUES& POSSIBLE SKYHYDRANT AT MATERNITY WARD AT BALIBO HOSPITAL

BACKGROUND

The Balibo House Trust requested me to inspect possible roof leaks and mould at the Maternity Ward at the Balibo Hospital, and the possibility of installing a SkyHydrant water supply system.

This report is prepared to enable the relevant agency(ies) to repair the current water leak and mould issues, and to agree on providing clean and reliable water to the maternity ward.

FINDINGS – WATER LEAKS AND MOULD

The Maternity Ward building measures about 12 metres x 35 metres in area. It sits at the rear of the main hospital building, and was built about 2007.

The **entire** ceiling material, both inside and outside the building, is covered with black mould, and there are many areas where it is clear that significant water damage to the ceilings has occurred.

I did not get up on the roof – my observations of the roof were from the sides of and under the roof.

Photo along the central hallway showing the black mould and several areas of water damage (indicated by the red circles). The water damage along the hallway indicates that water is entering via the central part of the roof line – ie the ridge capping area.

Black mould through the actual birthing rooms.
Tiles fallen off the lower parts of the walls.

One of the birthing rooms. Most tiles have fallen off the walls (some tiles remaining in the left corner). "New" birthing bed!

External ceilings badly water damaged, with the damage below the sloping ridge lines.

CAUSES

In my opinion, there are several causes for the damage and mould to the ceilings:

1. **Incorrect Fitment of Ridge Capping.**

The ridge capping has been laid along each of the roof ridges, but the capping has not been notched to fit into the roofing corrugations.

Combined with the building alignment, any prevailing wind-driven rain simply splashes under the ridge capping. The water damaged ceilings along the centreline of the building are evidence that the rainwater is entering along the ridgeline of the roof.

Photo of existing ridge capping

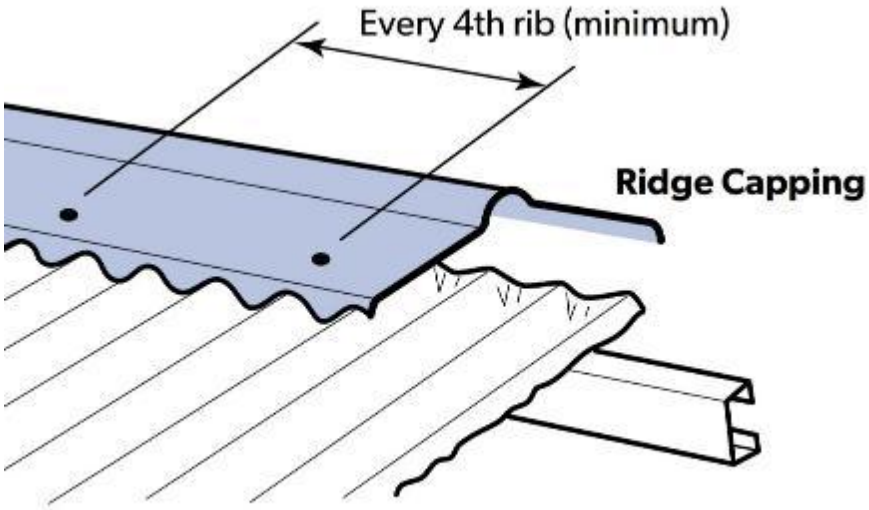


Diagram showing how ridge capping should be notched over corrugations

Photo of how the ridge capping should be finished, with the notching completed.

A hand operated notching tool matching the corrugations of the roof is available.

The distance between corrugations was 75mm, if a notching tool was to be purchased.

Further information is available from the BlueScope Steel website:

lysaght-roofing-walling-installation-manual

2. Positioning of Roofing Sheets and Ridge Capping

The roofing sheets should be laid such that the sheets either side of the roof centreline are as close as possible under the ridge capping. A gap between sheets on opposite sides of the roof should ideally be no more than about 50mm.

If the gap is much greater than this, rainwater can splash up under the ridge capping.

3. Overlapping and Sealing Between Ridge Capping Sheets

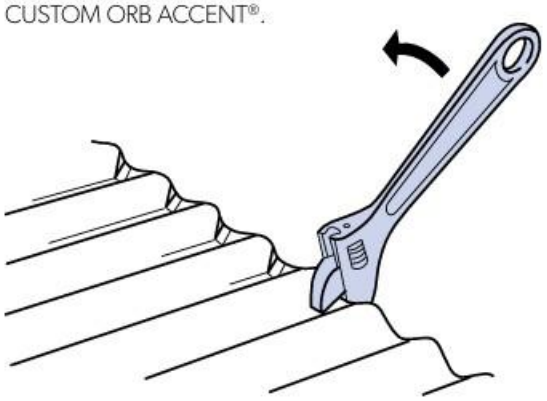
Lengths of ridge capping should be overlapped by at least 100mm to minimise any rain from entering between lengths of capping. A suitable sealant should be applied between lengths.

4. Turn-Up of Roof Sheet Ends

At the high end of roofing, wind can drive water uphill and under the flashing or capping, into the building. To minimise this problem, you turn up the valleys of each sheet at the high end of roofing. (This process is called “turning-up”).

FIGURE 10.1.2:

Turning-up CUSTOM ORB®, CUSTOM BLUE ORB® and CUSTOM ORB ACCENT®.



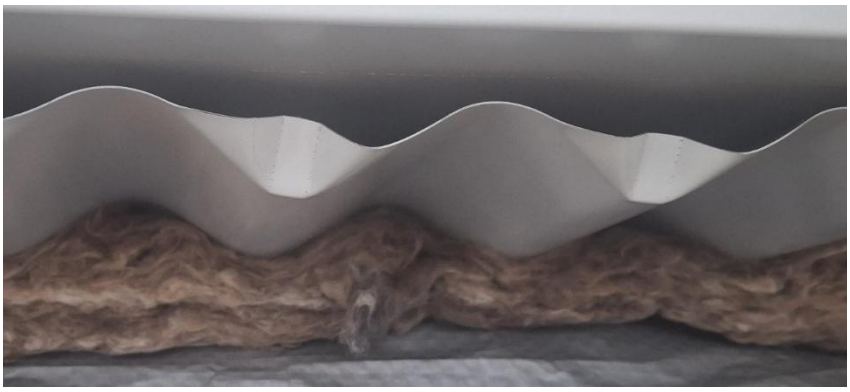


Photo showing the ends of roofing sheets that have been “turned up”.

5. Ridge Capping Not Secured

There were a couple of areas where the ridge capping was not fully secured down, which would allow water penetration.

Photo showing ridge capping not secured down.

6. No Foam Filler Strips Were Installed.

Expanded foam strips can be installed under the ridge capping at the upper end of the roof sheets. Expanded foam strips seal off gaps between roofing and ridge capping – protecting against dust, wind, rain and pests.

Photo of foam strips

The foam strips for corrugated roofing and information about them are available from:

www. metalroofingonline.com.au

7. Ceiling Mould and Damage

As can be seen above, virtually every ceiling panel throughout the entire building, including external eaves, has black mould on them, with most of the panels damaged.

> *Black mould can be dangerous to health. Exposure to black mould may cause symptoms such as sneezing, coughing, and eye irritation, particularly in individuals with allergies, asthma, or weakened immune systems. While it rarely causes serious illness, it can worsen existing respiratory conditions . Therefore it is important to address back mouldissues promptly to minimise health risks.*
>
> *Source: Copilot search*

The ceiling material used through the ward is a thin timber plywood. It appears to have been painted with insufficient layers of paint.

Black mould grows and spreads on materials containing cellulose, such as paper products and wood products (eg plywood). Black mould needs warm temperatures and moisture to grow and spread. This combination of wooden plywood, warmth and moisture clearly exists in Balibo.

Complete removal of the Black mould would require removal of the entire plywood ceiling panels – many of which are water damaged as well.

A suggested replacement, which does not contain cellulose is a pvc based panel. Each panel measures 200mm x 4m, and comes in a pack of 10 – meaning each pack covers an area of $8m^2$. The building area is 12m x 35m = $420m^2$. Therefore, 53 packs would be required at $US20 per pack, at a cost of $US1060. Suitable screws would also be required.

8. Ceiling Battens

It was noted that some of the ceiling battens (to which the ceiling material is attached), have significant rust.

Ceiling batten (to which ceiling sheets are screwed) almost completely rusted away. Note that the actual roof sheeting (not the ceiling sheeting) looks in good condition.

And again – ceiling batten badly rusted.
The quality of the concrete beam is suspect with all the crack lines through it.

It is recommended that all battens are inspected and replaced where necessary when the ceiling material is replaced. Knowing that many of the battens are rusted, it would be wise to pre-purchase say 10% of the total required battens, so that ceiling replacement work could continue while additional battens were purchased, if required.

9. Ceiling Insulation

The Hospital midwife asked if ceiling insulation could be provided – in order to reduce the afternoon temperatures in the ward.

While there are roof leaks and back mould present, any insulation would only worsen the state of the ceiling and battens.

I therefore recommend that no insulation be installed until the ridge line roof leaks are repaired and the ceiling panels are replaced.

CLEAN WATER SUPPLY

Regular continual water supply from the village system does not exist. For at least two days in a row, no water was coming from the town supply at the Community Centre. This is clearly not acceptable at the maternity ward.

Existing Water Supply Facilities:

There is an existing, unused tank stand of about 4m in height. It is in good condition and appears to have been well constructed. It could be used to hold a “dirty water” tank.

Adjacent to the tank stand is an old, unused Profile tank of 1,100 L capacity. It is sitting on a concrete tank stand, which will provide sufficient height to enable water to be gravity fed to the maternity ward. This tank could possibly be cleaned and used as the “clean water” tank.

At the front of the hospital compound, there are two water tanks that appear to be either not used or are under utilised.

Apparently under-utilised 2,400L Danke tank

Unused 3,200L Rotomold tank

This Rotomold tank could be used as the dirty water tank.

If approval to use the existing tank stand, the 3,200L Rotomold tank and the existing yellow Profile tank were made, the only material costs of the project would be:

- Gould pump - $US460
- SkyHydrant filter unit – existingu it held by Balibo CLC
- Shelter house
- Piping& tap fittings
- Electrical connections

This would appear to be a very cost effective and short duration project to supply clean water to the maternity ward.

OVERALL RECOMMENDATIONS:

The following recommendations are made:

1. Conduct a full on-roof inspection to ensure:
    a. there are no obvious holes or water entry points, and rectify these.

    b. Lift a number of lengths of ridge capping (especially above water damaged ceilings) to determine:
        i. Distance between roof sheets at ridge line,
        ii. Overlapping distance between lengths of ridge capping,
        iii. If any “turn-ups” have been made to roof sheet ends
2. Either purchase a ridge cap notching tool and notch the ridge caps, or install the foam filler strips. (The latter will be a simpler options).
3. Secure screw down all ridge capping.
4. Remove all existing ceiling panels, room by room, carefully inspect ceiling battens, replace battens as required, and install pvc ceiling lining panels.
5. Install a SkyHydrant water system to the maternity ward, using existing materials, as detailed above.

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