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BILOELA RESERVOIR

PROJECT SUMMARY

Client: Banana Shire Council

Location: Biloela

Duration: 4 Months (2017)

Project Value: $ 1 M

Major Challenges Overcome:

- Unforeseen defects
- Floor membrane and varying conditions
- Poor quality of the substrate

The Project

Banana Shire Council (BSC) engaged Epoxy Solutions to carry out the structural remediation and waterproofing of a 9Ml reservoir in Biloela. The Biloela Reservoir is a 9 Ml reservoir with an aluminium roof that is supported by 69 reinforced concrete columns. The reservoir was constructed in 1967 and required rehabilitation work to maintain the structural integrity and durability.

A structural condition assessment done early 2017 identified defects that require remediation for long and short-term operation. The defects ranged from minor surface repairs, to large grout pours and reinforcing replacement.

The initial scope included a polyurea membrane to be applied to the columns and floor joints only. However, Epoxy Solutions was able to offer the client a value proposition to apply the membrane throughout the reservoir, which included the floor. The client

BILOELA 9ML RESERVOIR

accepted the offer on condition Epoxy Solutions completed the project with a specified time frame. The timeframe was extremely tight, which forced Epoxy Solutions to increase resources and work longer hours.

Programme

The repair work commenced on end July 2017 and was completed late November 2017 to allow for re-filling. This date was critical to BSC Although the scope of work almost doubled, Epoxy Solutions was able to plan around these challenges and still deliver the reservoir on time.

Project Scope

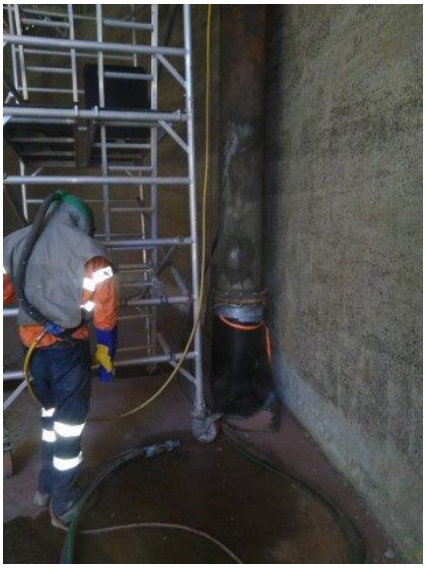
The project comprised of the following work:

- Provide safe access
- Concrete repairs to: Internal Wall; Columns; Floor; Jointing; Buttresses and External Wall
- Repair / re-filling joints
- Protective coating to steelwork
- Anti-carbonation coating to the buttresses
- Minor steel work, such as a new inlet, hand railing and new marine grade ventilators
- A new polyurea membrane to the columns, wall, joints and floor

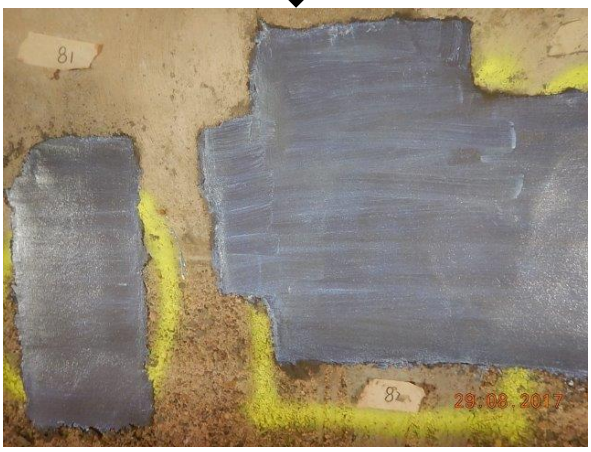
Completed Works

The following works were successfully carried out:

Overflow pipe coating
The overflow pipe was severely corroded and required a new epoxy coat. An AS4020 epoxy coating was applied in three coats. The steel was first abrasive blasted and tested for salts, blast profile and whether it met the class 2.5 standard. After this it received 3 coats of a high solids epoxy and sprayed with polyurea.



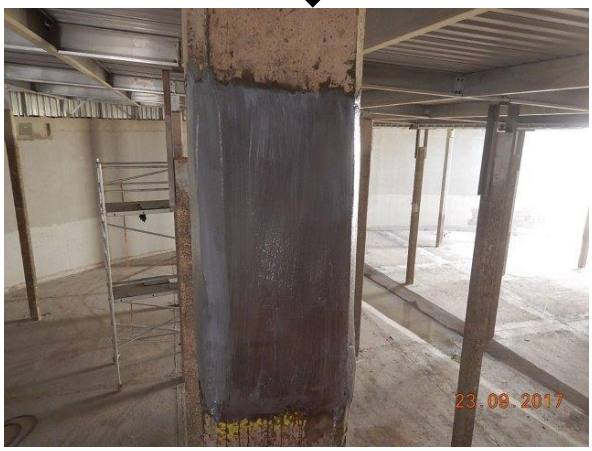
Wall concrete repairs
The defects were marked out, depth of steel determined, and the poor concrete removed. The steel was then coated with a zinc rich coating and the defect repairs with a high strength cementitious compound. Where required, the reinforcing was replaced/



Column concrete repairs

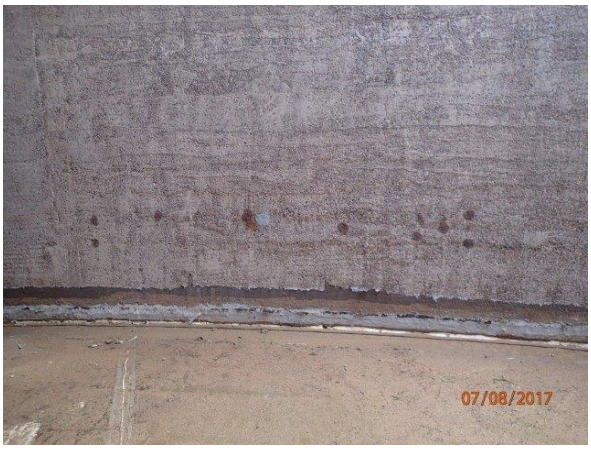
Majority of the 69 columns required repair. Many of the columns were in such a poor state that the repairs had to be staged to avoid complete failure.

As with the wall repairs, the location of the reinforcing was identified prior to any cutting. The poor concrete was then removed and repaired with a cementitious compound.



Wall Epoxy Rendering

A major challenge in applying the waterproofing membrane, was the condition of the poor condition of the concrete surface. The water had etched into the concrete overtime, exposing the aggregate and leaving a very uneven surface. The surface was too rough to apply the membrane and needed to be smothered. To do this we used an AS4020 approved epoxy feathering coat, which was applied directly to the etched surface. This was then later primed and coated with a polyurea membrane.



Floor screeding

The floor proved to be challenging as it was also etched, but also coated with a flexible water proofing membrane which had failed in many locations. As grinding was tedious, Epoxy Solutions derived a system to remove the old membrane and remaining surface laitance. An epoxy screed was then flatted off the surface and prepare it for the polyurea membrane.

Polyurea coating to floor, joints, walls and columns

Once the faring coat was applied to all the surface, a 2.5mm polyurea membrane was applied. Extensive testing was done to ensure a watertight seal. Polyurea membrane application and testing photos below:

Testing

Test panels/sections were prepared for each section and type of repair.

The following tests were completed:

- Visual Inspections (All repairs)
- Soundness of Repairs (Cementitious high build mortars)
- Compressive Strength Testing (Cementitious repair mortars)
- Adhesion Testing (High build mortars and, joint sealant and polyurea membrane).
- Continuity testing
- Environmental condition testing