

DESKTOP STUDY & CONDITION ASSESSMENT OF GOODWOOD ISLAND WHARF

Port Authority of New South Wales



Project Highlights

- Existing Impressed Current Cathodic Protection (ICCP) system damaged by major flooding in the river
- Initial assessment of life cycle costs associated with repair conducted
- Two-day on-site extensive investigation and testing undertaken to verify desktop assessment
- Extensive chloride-induced reinforcement corrosion discovered throughout much of the structure
- Hybrid CP remediation system recommended
- Approximate 30% potential cost saving compared to other remediation options

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The Goodwood Island Wharf is located on the Clarence River, Yamba, and was constructed circa 1968. The wharf is constructed with pre-cast driven concrete piles, reinforced concrete pile-caps and headstocks and an in-situ poured concrete deck. Deterioration of the reinforced concrete elements had been observed and the long term serviability of the structure was uncertain. Infracorr was engaged to initially complete a Desktop Study and then verify its assessment through an on-site Condition Assessment.



Under the wharf, extensive concrete deterioration and exposed reinforcement.



Testing on site as part of the investigation.



Desktop assessment identified and assessed remedial options for the wharf.

CHALLENGES

- An Impressed Current Cathodic Protection (ICCP) system had been installed in conjunction with substantial concrete repairs around 2006, however this system was damaged by a major river flood in 2013 and has not been operational since
- The wharf sits near the mouth of the tidal Clarence River with parts receiving significant amount of splash due to being positioned above breakwater rocks
- Infracorr initially conducted a Desktop Study to assess the life cycle costs associated with a variety of repair options
- A full Condition Assessment including quantification of defects was recommended to validate the findings of the desktop assessment
- Further testing revealed extensive chloride-induced reinforcement corrosion throughout the piles, pile caps and some headstocks with the majority of the deck remaining in good condition

SOLUTIONS

- A two-day on-site investigation was conducted including a visual and delamination survey, an electrical continuity survey, half-cell potential testing, chloride concentration modelling, carbonation testing, corrosion rate testing, concrete resistivity and hardness testing
- Through thorough investigation, Infracorr were able to document five concept remediation solutions for the client to consider
- Options were considered for both short and long-term outcomes and associated project costs
- The preferred long-term solution was for a Hybrid CP system to protect all active corroding areas, with localized patch repairs to spalling elements and silane coating to further protect exposed concrete above mid tide

RESULTS

- A clear recommendation for Hybrid CP system was delivered by Infracorr to the client
- This solution represented the lowest whole of life cycle costs of the five concept solutions when considering maintenance, ongoing works and lost capacity (by approximately 30%)
- Potential extension of the asset life in the order of 30 years would be able to be achieved