

Extending the Life of a Wharf Asset for PNG Ports

Extending asset life can make a real difference to the bottom line. Using state-of-the-art technology and innovative solutions means Advanced Materials and Strategic Asset Management specialists can extend the life of existing assets and find ways to add years to the life of new ones.

AECOM recently developed an asset management strategy providing an extra 30 years service life to a vital berth servicing approximately 50 percent of container movements among Pacific Island nations.

"PNG Ports needed a significant extension to the service life of reinforced concrete and steel elements at Lae Berth 3. To determine the most effective approach to achieve this outcome we combined a detailed condition assessment with service modelling data and outputs from our structural analysis. This enabled us to understand not only the remediation requirements now but what additional maintenance and upgrade works

would be required over the duration of the requested service life," said Phil Vimpani, AECOM's Advanced Materials Manager for Victoria and South Australia.

A specification for remediation works was developed including:

- concrete repair and cathodic protection of the reinforced concrete
- silane application for undamaged concrete areas
- pile protection and strengthening using reinforced concrete
- encasements, steel plates and wrapping system above mid tide
- cathodic protection of steel piles below mid tide.

During construction AECOM provided assistance and training to the resident engineer, and verified that the contractor's works complied with the technical specifications. This involved regular site visits to provide

advice, training, supervision of works and audits.

To ensure best practice, an extensive Quality Assurance system was used to manage the training requirements of the Papua New Guinea Ports Corporation engineers and resident contractors, and audits were undertaken at key stages.

Lae Berth 3 was designed by the Commonwealth of Australia's Department of Works in 1971 and constructed the following year. As there are no roads linking the Lae region to the south of PNG, this port is of vital importance to the economy of Lae and PNG. The berth operates at capacity for the majority of the year and is therefore a major strategic asset for PNG Ports Corporation.

When AECOM assessed the wharf it was found to be in a poor to very poor condition with significant deterioration of key structural elements. Major technical and logistical challenges needed to be overcome to deliver a project of this type in PNG.

Based on the testing and service life modelling, remedial works included the use of concrete repairs together with cathodic protection and corrosion inhibitors. To manage risks, PNG Ports Corporation and AECOM teamed up with Savcor ART.

AECOM and Savcor workshopped technical solutions following the condition assessment, and again following the development of the draft revision of the technical specification. This was to ensure the proposed design could provide PNG Ports Corporation with the best value engineering solution that also achieved all durability requirements.

All parties worked together to develop and implement a comprehensive process where PNG nationals with no previous experience in wharf remediation entered a site-based training and accreditation program to ensure knowledge was imparted and transferred to all team members.

The application of this specialist work to a project in PNG additionally required specialist supervision. AECOM worked very closely with a PNG Ports appointed engineer and trained him in key technical aspects of wharf remediation and cathodic protection. The extensive Quality Assurance system was developed to specifically manage training requirements of PNG Ports' engineers as well as the PNG nationals working on the Savcor ART team to ensure that best practices were achieved.

All repairs and related activities were undertaken in a sequence that prevented any disruption to port operations. It was PNG Port Corporations' requirements that the berth was to be kept fully operational at all times.

By enabling this wharf to achieve an additional 30 year service life, PNG Ports Corporation has been able to continue using extremely important, existing infrastructure and port facilities and avoided the need to

demolish and rebuild with all the logistical difficulties and disruption to the local community that would have entailed.

Savcor supported the local community during the project by constructing additional school facilities at a local school. Construction of the school classroom used surplus 44 gallon drums (which were flattened to make a roof) and timber from pallets was used to make walls and a floor. AECOM helped by collecting games and educational materials which was donated to this and other schools in Lae and also assisted by donating a significant quantity of surplus books, stationery, clothing and umbrellas from its offices all over Australasia.

The remediation has set a high benchmark for undertaking difficult wharf remediation projects in remote locations where there is no existing local skill base but where it is vital that a high degree of quality, durability, constructability and safety is achieved.



Lae Berth 3



Lae Berth 3



Access was required to the soffit of the wharf



AECOM and PNG Ports engineers working in partnership for the management of remediation works