HMAS Coonawarra Ship Yard Rail Replacement

Project Profile

Client	Aurecon
Location	Darwin, Northern Territory
Value	$1.6 million
Duration	May 2016 - April 2017
Contract Type	Lump Sum Construct Only

Project Overview

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HMAS Coonawarra is a Royal Australian Navy base located in Darwin, Northern Territory. It is an important shipping port for the Royal Australian Navy as it serves as a gateway to northern neighbours and is the centre from which the Department of Defence conducts border integrity operations.

HMAS Coonawarra's infrastructure includes a vertical ship lift used to raise Royal Australian Navy vessels out of the water for ease of performing routine ship maintenance. A crane positioned on four parallel rails is used to lift the ship and transfer it to one of 12 maintenance bays.

One of Defence's project management partners, Aurecon, were requested to undertake a structural assessment of the existing 530m of rail in Bays 1 and 2 to determine their operational condition. The rails were found to have deteriorated due to flaking and pitting corrosion. They were also found to have poor alignment in both horizontal and vertical directions with respect to other rails,

and therefore were operating outside their design tolerance limits.

Scope of Work

Aurecon engaged Intract to remove and replace the rails, however upon project commencement it was discovered that the foundations under the existing rails were almost non-existent. Aurecon produced new designs and a scope change ensued. Intract's new scope still included the removal of the 530m of 60kg/m rail and its replacement with new rail, with additional works including the demolition of 570t of concrete and its replacement with 1,200m² of poured concrete.

Concrete was cut to 200mm on either side of the rail and to 200mm depths. 5t and 13t excavators with rock-breaking attachments cleared the concrete debris. Rail and rail bolts were cut using oxy acetylene torches and cleaned out with the excavator. Concrete footings were also removed using a similar method.

The next stages of the works incorporated a specialised process not widely used in Australia. Steel cages were laid and new concrete was pumped in on a boom pump allowing the concreate to be laid as a continuous monolithic pour. The final trim of the pads for the ground slab included the placement of steel mesh and earthing cable.

Concrete works also provided new detailing to allow for proper drainage in the rail recesses where previously water had been collecting, and therefore vastly improving the rate of rail deterioration. Hold down bolts were then installed using rotary hammers while new rail sections were aluminothermic welded together.

Rail was installed by lifting it in with excavators onto levelling plates. Tolerances were extremely high for the final rail placement. This was achieved by installing levelling plates that were checked by a surveyor prior to installing the rail. This ensured that only minor adjustments were required when the rail was in place. When all rail works were complete, the underside of the rail was grouted and concrete infill works were performed. Joint sealant was applied to all saw cuts and joints. Project finalisation works included line marking.

Throughout the project the Royal Australian Navy was engaged and notified of any potential noise, fumes or light emissions that may be experienced at the different construction stages.

Indigenous and Local Participation

Intract self-performed the majority of the works, with all but one subcontractor being from the local Darwin area. Subcontractors were engaged for surveying, welding and concrete cutting. 90% of the workforce were local employees. Engagement of three Indigenous personnel achieved 38% Indigenous participation on the project.