

## REINSTATEMENT OF CONCRETE PIERS IN TIDAL ZONES ABOVE LWL

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### INTRODUCTION & SCOPE

Concrete piers and seawalls supporting above marine structures are subject to extreme erosion and concrete deterioration. This can result in loss of concrete that can become extreme and the structure can fail unless remedial treatment is instigated to reinstate and protect the concrete.

This bulletin details the recommended method of reinstatement and, equally important, protection of the structure from excessive future erosion and corrosion.

### THE PROBLEM

Structural or potentially structural cracks, honeycombed pockets, holes and faulty or deteriorated construction joints have always existed on this concrete pier, seawall facing the sea. The structure is in a highly variable tidal zone and the texture of concrete is generally very rough allowing maximum impact damage to be caused by the incoming tides.

Years of physical attack from wave and general sea movements and chemical attack from the salt water has damaged the integrity of the concrete, and the neutralisation of the alkaline passive nature of the concrete protecting the reinforcing steel has resulted in the corrosion of the reinforced steel, causing further physical damage to the concrete.

Huge monies have to be budgeted for routine maintenance every year.

Effective long term protection was considered essential from both cost and serviceability reasons.



### STRUCTURAL REPAIRS

All surfaces were high pressure turbo water blasted to remove all loose and structurally unsound concrete.

Exposed reinforcing steel was thoroughly cleaned by hand wire brushing to be free from all corrosion products. Steel that had suffered a metal loss in excess of 40% was cut out and replaced. The new steel sections were tied into the old steel.

The exposed reinforcing steel was protected by coating with an epoxy cement slurry and a bonding bridge of the same material applied over the concrete areas to be repaired to produce a structural bond between the repair mortar and the original concrete. The slurry coat was prepared by mixing equal volumes of ARDEX WPM256 HydrEpoxy and cement with a small quantity of sand to form a thick brushable slurry consistency.



A high strength concrete repair mortar was prepared by mixing equal volumes of ARDEX WPM256 HydrEpoxy and cement with 2 to 3 volumes of sand. The repair mortar must be placed while the slurry coating remains wet. Damaged areas of concrete were repaired taking care to work the mortar in behind the reinforcing steel and worked into the old concrete.



The slurry coating and repair mortar were progressively installed down the structure with the receding tide and ceased just before the tide reached LWL (low water level). This allowed initial set to occur during the turn of the tide and the epoxy/cement mortar continued to cure underwater.

This process was repeated with the outgoing tides until all surfaces had been reinstated.

Restoring the integrity of the structural concrete.

### CONCRETE PROTECTION

The entire surface is then treated by coating with ARDEX WPM300 HydrEpoxy waterproof membrane to prevent the ingress of water and chloride ions into the concrete. A primer/bond coat was first applied to achieve maximum bond strength to the substrate



**The ARDEX WPM300 HydrEpoxy has been applied to the surface and the incoming tide rises**

concrete. While this coating remained wet the first coat of ARDEX WPM300 HydrEpoxy was applied progressively with the receding tide in a similar manner to the installation of the concrete repairs. The second coat of ARDEX WPM 300 HydrEpoxy was applied the next day with the receding tide.

The final cosmetic coat consists of ARDEX WPM300 HydrEpoxy mixed with cement in equal volumes and applied using a mohair roller to produce a natural unobtrusive surface finish.

**IMPORTANT**

This Technical Bulletin provides guideline information only and is not intended to be interpreted as a general specification for the application/installation of the products described. Since each project potentially differs in exposure/condition specific recommendations may vary from the information contained herein. For recommendations about specific applications/installations contact your nearest Ardex Australia Office.

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**REASON FOR ISSUE**

Review and update information

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