

New Performing Arts Venue The State Theatre Centre of WA (STCWA)

Perth, Western Australia



Reinforced Concrete - Waterproofing & Durability;

Everdure Caltite & 3CC - Hydrophobic Pore-blocking Ingredients (HPI)

Design-Life, Maintenance-Free, Impervious & Corrosion-Proofed Structural Concrete



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| CLIENT: | WESTERN AUSTRALIAN DEPARTMENT OF TREASURY AND FINANCE - BUILDING MANAGEMENT AND WORKS |
| PROJECT OWNER: | WESTERN AUSTRALIAN DEPARTMENT OF CULTURE AND THE ARTS |
| ENGINEER: | AIREY TAYLOR CONSULTING |
| MAIN CONTRACTOR: | JOHN HOLLAND CONSTRUCTIONS |
| WATERPROOFING: | Everdure CALTITE concrete - 900 m ³ ; 3CC concrete – 2,225 m ³ |

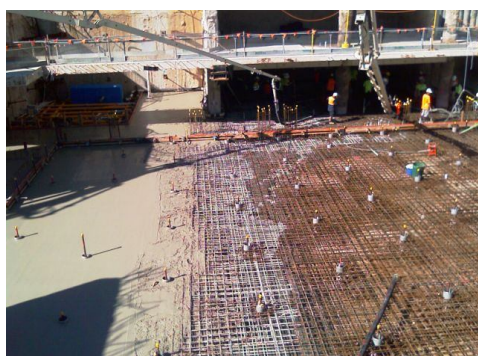
Opened in January 2011, the \$91M State Theatre Centre of WA (STCWA) is a world class venue for performing arts, located at a prominent corner of the Perth Cultural Centre, home to the Art Gallery of Western Australia, the WA Museum, the State Library, the Perth Institute of Contemporary Arts, Arts House and several other culture and arts organisations.



A large part of the building is positioned underground for economy of footprint and includes the multi-purpose Studio Underground and artists' Green Room, make-up and changing areas.

The high water table level in the reclaimed Lake Kingsford site selected for the venue, means the building is subject to more than 60kPa design uplift pressure (up to 85kPa / 7.4m at the lift pit area). Moreover groundwater/soils analysis indicated presence of Potential Acid Sulphate Soils (PASS).

Achieving 100+ year design-life was a requirement set by the Client. Prevention of moisture-vapour ingress was another design requirement, to reduce the risk of dampness and fungal growth in timber and fabric finishes. These conditions meant that a completely effective and permanent waterproofing system for the concrete substructure was required.

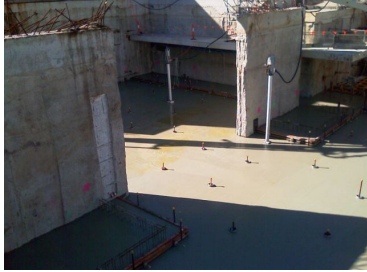


STCWA, Perth; Construction;
CALTITE concrete "composite-casting" to
top 300mm thickness of base slab

Installation of waterproof tanking barriers would be difficult and time consuming and require sacrifice of valuable internal area. In addition, no tanking system is certified for the stated design life.

Enhancement of the water and moisture vapour-resisting properties of the concrete shell itself offered the most cost-effective and sustainable solution to achieving the required waterproofing and durability performance and was considered a critical design objective.

Due to the presence of Potential Acid Sulphate Soils (PASS) in the reclaimed lake site, the design team selected diaphragm and secant-pile walls made using Self Consolidating Concrete (SCC) with proven Hydrophobic Pore-blocking Ingredients (HPI), to form the water and soil retention system. Cementaid Everdure CALTITE and 3CC Hydrophobic Pore-blocking Ingredient (HPI) were selected to provide the design-life waterproofing and durability required for the substructure concrete



Everdure CALTITE "composite" raft slab after finishing



3CC concrete pile wall (top left), Diaphragm wall section (right) and CALTITE "composite" slab.



Completed Studio Underground



Cementaid 3CC Hydrophobic Pore-blocking Ingredient was used to waterproof concrete used in the diaphragm and secant-pile walls. EVERDURE CALTITE HPI was used in casting the top 300mm of the 600mm thick Basement Raft Slab, as well as in the exposed concrete cladding panels. The HPI concrete placements were all completely successful with only minor post-construction seepage through a section of faulty construction joint, which was easily and quickly rectified by acrylic grout injection.

The Centre's January 2011 grand opening and subsequent WA Festival of Arts were a major success. The HPI concrete used successfully and cost-effectively achieved the project's waterproofing and durability objectives. The Centre's completed basement theatre and other areas are bone dry and performing to the satisfaction of all parties.

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