Everdure CALTITE System

Hydrophobic Pore-blocking Ingredient (HPI)

Project Seabird Naval Base

Phase 1B: Shiplift Civil Works; Contract No: DGSB-04/2002-03



Project Seabird is the Indian Navy's premier defence project to meet India's strategic needs in the coming decades, through a futuristic naval base at Karwar (Karnataka). Project Seabird, covers more than 8000 acres of land along the western coast, and entails creation of operational base facilities to handle a large number of warships and aircraft, along with a dockyard for repair, refit and modernization of ships and submarines. On completion, the naval base will be the largest this side of Suez.

The engineer appointed by the Department of Defence for carrying out the design, supervision of construction and contract administration for the Shiplift Civil Works was REDECON Australia Pty Ltd, a fully owned subsidiary of Sinclair Knight Merz. The contractor engaged for executing civil works is M/S SKANSKA Cementation India Ltd under Contract No. DGSB04/2002-03, awarded at end November 2002.

To ensure maintenance-free design-life durability of the high quality pre-cast and in-situ marine concrete, all sections below RL +3.5m were specified to include **Everdure CALTITE Hydrophobic Pore-blocking Ingredient (HPI)** in the concrete mix. This includes:

- Pile caps
- Service duct base and walls to underside of roof
- Shiplift beams
- Edge beams
- Support beams for Shiplift Control Building/DSS-5
- Light tower foundations
- Sewage/Oily Bilge Intermediate Storage Tanks
- Trade waste collection pit
- 20m length of service duct to each of the Dry Berth and Washdown Berth
- 20m length of service duct east of eastern limit of Pier No. 1
- Pipe outfalls



Project Seabird; Pier No. 1 & Shiplift Piers CALTITE pre-cast & in-situ marine concrete



Specification requirements of the HPI marine concrete;

Maximum Water/Cement Ratio by Weight	0.35
Minimum Cement Content	400kg/m ³
Minimum 28 day Strength (Cube)	55MPa
Maximum Drying Shrinkage (28 days)	500
	microstrain
Maximum 30 min water-absorption @ 7 days age	1 %

For the design of the concrete mixes, an extensive range of trials was carried out by SKANSKA. Rules were set for concrete production and quality control within an effective quality plan and work guideline. Fully equipped laboratory facilities were installed to monitor and confirm compliance of concrete with key performance requirements, including strength, water absorption and linear shrinkage.



Project Seabird; Pier No.1 and Shiplift Piers

In early 2003, construction of Phase 1B of the project commenced, casting a total nearing some 13,000 cubic metres of Caltite System concrete between December 2003 and December 2004.



All test samples from a total of approximately 13,000m3 of Caltite System production concrete complied with all specified requirements. *Typical*;

Compressive strength	av. = 72MPa
7-Day Absorption	av. = 0.69%
Shrinkage; @ 80mm slump	av. = 317ms
@125mm slump	av. = 386ms

Commenting on the project's Concrete Quality Report, Redecon's Principal, Mr. Rick Turland stated, "The control on the Caltite must have been very good...Shrinkage results are very low, and overall this is the best marine concrete I have seen anywhere".

The completed 100,000 tonne Shiplift was commissioned in May of 2005.



Project Seabird; Design-Life Maintenance-Free Concrete

The CALTITE System ingredients and Site Services Project Management were supplied by Cementaid International Marketing Ltd (HK). Cementaid's on-site Quality Assurance Engineer co-ordinated Site Service and QA Monitoring of all CALTITE System production concrete for the project.



Project Seabird; Dry washdown berths transfer bay

Contact the <u>Cementaid Technical Service Centre</u> in your world region for additional information, service or advice, or visit our website at <u>www.cementaid.com</u> now.



Everdure CALTITE System Hydrophobic Pore-blocking Ingredient