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— Kim Jae Hyuk of Chung Suk Engineering

The Project – Seoul Subway Line 9

A fully bonded, positive waterproofing system for congested city tunnel construction

Seoul, the capital city of South Korea and home to some 11 million inhabitants, is a large city by any measure. To cater to the transport needs of its mushrooming population, the Seoul subway network is being extended and a new line, Line 9, is also being added. Construction of the Seoul Subway Line 9 started in 2003, and links Gimpo airport in western Seoul to Gangnam business district in southern Seoul. Section 1 is 25.5km long, with 25 stations including 13 transfer stations, and is expected to open in 2009.

► Challenges – Waterproofing A Continuous Wall System

A major transfer point of Line 9 Section 1 is Dongsan Station, which allows commuters to transfer to Line 2. An underground station, it sits underneath a roadway in the old city centre of Seoul. The confined tunnel construction space due to its location within the business district presented challenges for waterproofing design.

Kim Jae Hyuk, Vice President of Chung Suk Engineering, explained the challenges the architect team faced regarding waterproofing decision: “The diaphragm wall was designed as the soil retention system in most parts of this project. The greatest concern was to ensure positive/ blind side waterproofing application for this continuous wall system. In fact, the Bentonite system had been considered for waterproofing before Grace’s Preprufe was introduced.”

Client: Seoul Subway Corporation

Architect/Specifier: Chung Suk Engineering

Contractors: Hyundai Engineering & Construction Co., Ltd.

Waterproofing Applicator: Joong Ang Gong Sa

For questions, e-mail us at: international.projects@grace.com

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► Solution - A Fully Bonded Waterproofing System

Working with Chung Suk Engineering to gain understanding of the project requirements and concerns, the team at Grace Construction Products put together a waterproofing solution proposal to address those concerns. S. J. Oh, Global Specifications Consultant at Grace Korea, explained why a fully bonded system is critical for positive/ blind side waterproofing. “When structures are constructed below ground, they are subject to water pressure. In the case of positive waterproofing, the water pressure will be coming externally against the membrane on the structural foundation. When waterproofing membranes are not fully bonded to the structure, all it takes is a single leakage to cause water ingress and extensive damage.”

Oh adds, “After discussions with Chung Suk Engineering, we considered all the project requirements and proposed a waterproofing system that included Preprufe® 300R waterproofing membrane for the substructure, Bituthene® 3000 waterproofing membrane for above ground slabs and vertical walls (cut and cover portion), and Servipak® 3 as protection board system.” Kim said, “The most important factor for choosing Preprufe is the fact that it is fully bonded directly to the concrete structure, without any chemical reaction, and it prevents water migration between the concrete structure and waterproofing product.”

When the Chung Suk Engineering team visited Singapore and its mass rapid transit system construction site, the fast and easy installation of the Preprufe waterproofing membrane system was also evident. Preprufe can be applied on wet concrete and is immediately traffickable after installation, which is a tremendous aid to the construction schedule.

Grace Product Solutions Used

- Preprufe® 300 R and Bituthene® 3000 waterproofing systems
- Servipak® 3

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