

Geocellular Retaining Wall Protects Korean Resort

Presto Products Geoweb® Cellular Confinement System used to Construct the Largest Retaining Walls in Korea

Perched on top of a mountainous area in Kangwon-do, Korea, the Phoenix Park Resort is protected from the effects of erosion by a system of walls including the largest retaining wall in Korea.

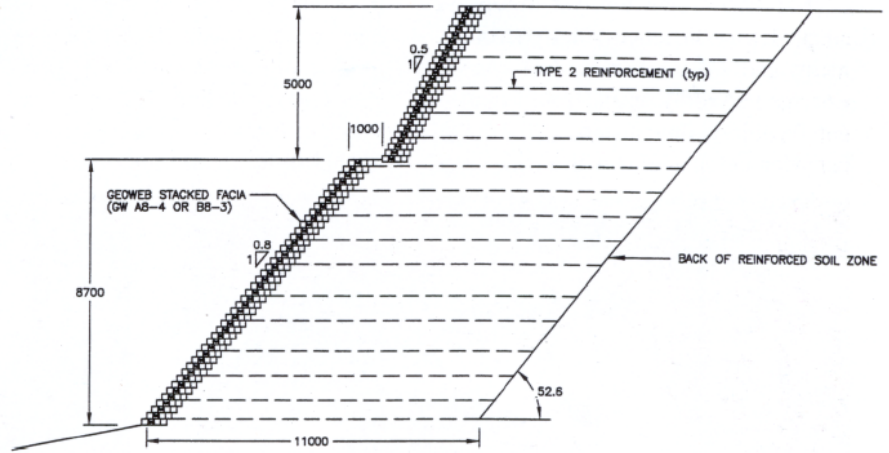
The mountainous location of the resort makes it a favorite destination of tourists and vacationers, but the rugged terrain demanded the wall have several key characteristics: First, it had to be durable. The wall must resist the effects of erosion, yet retain the flexibility needed to conform to anticipated differential settlement. Second, the wall had to be unobtrusive. It had to blend in with the resorts surrounding environment. Finally, there were strict budget guidelines. Expenses had to be kept to a minimum.

These concerns led E & S Engineering Company, a Presto distributor in Seoul, Korea, to recommend the Geoweb® cellular confinement system over traditional retaining wall materials, such as wood, steel or concrete.

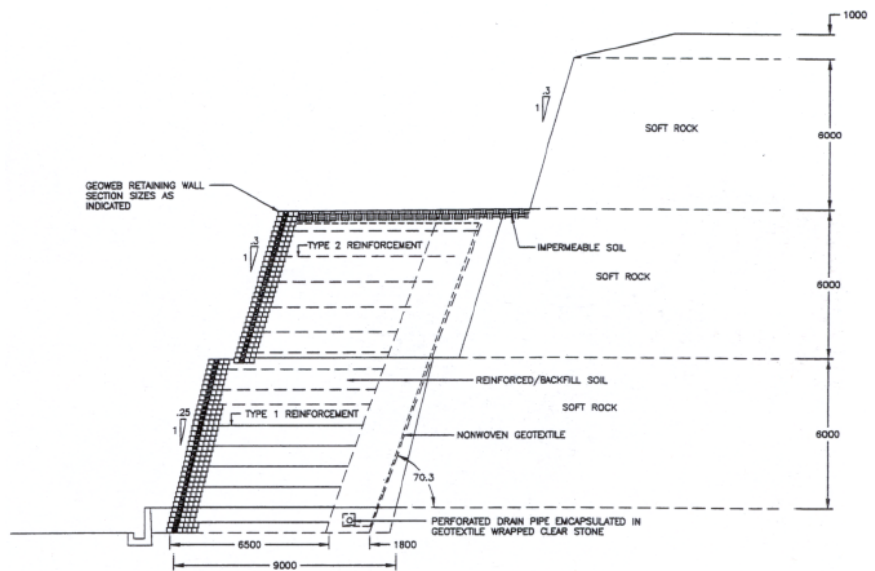
The Presto Geoweb system is an engineered, expandable, polyethylene, honeycomb-like cellular structure used to confine and improve the performance of infill materials. The system has proven applications in earth retention, as well as slope, channel, and load support.

The use of this earth retention system at the Phoenix Park Resort met the key criteria by providing: 1) a very steep or nearly vertical surface which minimizes erosion and remains structurally stable under its own self weight and known externally imposed loads, 2) natural vegetative cover by filling outer cells of the stacked Geoweb sections with topsoil, giving the wall the ability to blend in naturally with the Resorts environment, 3) complete construction, in only two months, this provided the cost savings needed to keep the project within budget.

The stacked structure was formed by layering tan-faced, 203 mm (8 in.) depth Geoweb sections. Each section was infilled with the required material and compacted. Subsequent layers of the Geoweb system were stacked on the



DESIGN ASSUMPTIONS 1. GEOWEB INFILL AND REINFORCED SOIL phi=30, gamma=17.8 kN/cu.m 2. EMBANKMENT AND FOUNDATION SOILS phi=30, gamma=17.8 kN/cu.m 3. REINFORCEMENT LONG TERM ALLOWABLE DESIGN LOAD (LTADL) TYPE 1 REINFORCEMENT - 46.2 kN/m TYPE 2 REINFORCEMENT - 27.1 kN/m 4. ADEQUATE DRAINAGE PROVIDED TO PREVENT HYDROSTATIC PRESSURE BEHIND GEOWEB FACIA 5. GLOBAL STABILITY OF THE SLOPE NOT INCLUDED WITH PRELIMINARY ANALYSIS 6. OF REINFORCED SLOPE	PHOENIX PARK STEEP SLOPES STA. 41	InterSol Engineering Inc. Mississauga, Ontario, Canada	
	PROPOSED GEOWEB STACKED VENEER PRELIMINARY DESIGN	SCALE: NTS DRAWN: JCW CHECK:	DATE: March'95 FILE: PHOEN041.DWG DRAWING: 1



DESIGN ASSUMPTIONS 1. GEOWEB INFILL AND REINFORCED SOIL phi=30, gamma=18 kN/cu.m 2. FOUNDATION SOIL phi=35, gamma=20 kN/cu.m 3. REINFORCEMENT LONG TERM ALLOWABLE DESIGN LOAD (LTADL) TYPE 1 REINFORCEMENT - 48.2 kN/m TYPE 2 REINFORCEMENT - 27.1 kN/m 4. ADEQUATE DRAINAGE PROVIDED TO PREVENT HYDROSTATIC PRESSURE BEHIND GEOWEB FACIA 5. GLOBAL STABILITY NOT CONSIDERED AS PART OF WALL DESIGN ANALYSIS 6. EXISTING ROCK STABLE - NO EARTH PRESSURE ON WALL	PHOENIX PARK STEEP SLOPES	InterSol Engineering Inc. Mississauga, Ontario, Canada	
	PROPOSED GEOWEB STACKED VENEER PRELIMINARY DESIGN	SCALE: NTS DRAWN: JCW CHECK:	DATE: May'95 FILE: PHOENS.DWG DRAWING: 1

preceding layer with a minimum setback until the wall height was achieved. At required design intervals, a polymeric geogrid or high strength woven geotextile was sandwiched between the Geoweb layers for soil reinforcement.

The basic Geoweb system can be adapted to a wide range of design requirements and site conditions. The systems extreme versatility results from its inherent flexibility, unique load deformation behavior and suitability with a wide range

of infill material and foundation soils. Colored fascia panels can also be incorporated to further blend the system with the surrounding environment.

The largest structure measures 200 m (650 ft.) in length, with heights varying from 6m to 14 m (20 ft to 46 ft.). Slopes range from 1h:8v to 1h:.25v for all walls.

The project is complete after one year of construction. The owners of the Phoenix Park Resort are pleased with the performance of the Geoweb system

and the impact the large vegetated structure has on its visitors. People who visit the resort are astounded by the size of the wall structure and impressed with how well the system blends with the surrounding natural area.

City: Kangwon-do, Korea

Contractor: Samsung Construction Company, Ltd., Contact Bonghyun Cho
Phone 82 374 34 0771

Engineer: Unisystems Korea, contact
Junsik Kang, Tel 82 374 34 0771



Photo 1. Stretcher frames are used to keep the Geoweb® sections expanded during infilling operations.



Photo 2. The Geoweb® earth retention structure conforms to tight space constraints and differential settlement.



Photo 3. The completed Geoweb® wall measures 200 m (650 ft) in length with heights from 6 - 14 m (20-46 ft).