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Retaining Walls – Part I

By Ronald Thornton, PE

The number of Precast retaining wall systems on the market seems to be increasing by leaps and bounds. There appears to be at least one or two new products on display at every trade show. We are not surprised at the steadily increasing demand for retaining walls for two reasons: 1) The number of ideal sites for development, meaning those that do not require significant regrading, are becoming scarce. 2) Precast concrete remains the material of choice for ease of construction and long term durability.

No matter what the type of retaining wall is, the fundamental design concept remains the same. Soil pressure and hydrostatic forces acting on a wall creates destabilizing forces which must be resisted by a structure of sufficient weight and center-of-gravity to overcome those forces by an adequate factor of safety.

The design of any retaining wall system requires a good deal of knowledge about the site on which it is to be constructed including existing topography, soil and drainage conditions, and the proposed final plan and profile. This information should be provided in sufficient detail within the plans, specifications and site geotechnical report.

Since the overall stability of a retaining wall is largely dependent upon the soil parameters, let's first address what we should find in the geotechnical report.

Much of the information contained in the geotechnical report is based on the analysis of boring samples obtained at various locations about the site. The boring log

typically describes the types of soil encountered at various depths according to the Unified Soil Classification System. Unless a more detailed laboratory report is provided, the soil classification may be used to approximate the engineering properties of the soil necessary for design including the unit weight (γ) and internal friction angle (Φ). See below.

The presence of ground water can significantly increase the lateral forces acting on a retaining structure. The geotechnical report should establish the peak water table elevation so that proper drainage measures can be incorporated into the retaining wall system.

Typical Names of Soil Groups	USCS Group Symbols
Well-graded gravels, gravel-sand mixtures, little or no fines	GW
Poorly graded gravels, gravel sand mixtures	GP
Silty gravels poorly graded sand silt mixtures	GM
Clayey gravels, poorly graded gravel-sand-clay mixtures	GC
Well-graded sands, gravelly sands, little or no fines.	SW
Poorly graded sands, gravelly sands, little or no fines.	SP

Delta attends NPCA Convention

Ron Thornton proudly represented Delta Engineers at the recent NPCA 43rd Annual Convention in Maui. Ron serves as a member of the NPCA Technical Committee. Ron is also a member of the ASTM C27 Committee and will be participating in ASTM Committee Week during the first week of December.

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The Delta Advantage

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Tucked within the steel framework at the top of this 57 story building is a liquid damper control structure made from over 60 precast panels stitched together with massive weld plates and Diwidag post-tensioning rods. The purpose of the tank is to control the sway of the building under wind loads and during potential seismic events.



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