Skhalta Dam – Design of a hardfill dam founded on deep alluvium and lacustrine deposits

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SYNOPSIS The proposed Skhalta Reservoir is part of the Shuakhevi HPP scheme to develop the hydropower potential of the Adjaristsqali River and its tributaries. It is located in the Autonomous Republic of Adjara, in southwest Georgia. The reservoir will provide diurnal storage and will facilitate the transfer of flows between catchments. It will have a gross storage volume of 2.0Mm³ and will be impounded by a 27m high Faced Symmetrical Hardfill Dam (FSHD) approximately 160m long at crest level.

The geology at the site consists of deep alluvium deposits (typically sands and gravels) with a significant variation in depth across the valley. At each abutment the valley slopes are steep and rock is found relatively close to the surface, whereas in the centre of the valley bedrock is up to 50m below the surface. Within the upper alluvium deposits there is a layer (4m-5m) of low strength finer grained material. This is associated with a historical reservoir formed following damming of the river by a landslide downstream of the proposed dam site in 1989.

The foundation conditions require a structure appropriate for low strength foundations that can tolerate significant differential settlements during construction. A Faced Symmetrical Hardfill Dam was therefore selected.

The significant variations in thickness of the alluvial deposits and the presence of a low strength layer have been major considerations in development of the design. Ground improvement measures comprising interlocking soil mixed panels have been developed to provide the required foundation strength and a full cut-off to rock has been specified to reduce seepage to acceptable levels.

This paper describes design aspects of the dam with particular emphasis on the dam foundations.