

Dissertation abstract

„Analysis of cooperation of geosynthetic encased column with soil”

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Geosynthetic Encased Column (GEC) columns present an improvement of well known “traditional” stone or sand columns, which are installed in soft soil with a low bearing capacity and a low stiffness modulus. The GEC extension is based on geotextile encasement around the column. It protects against internal damage such as an excessive lateral deformation (bulging) and also prevents against squeezing out of the mineral filling. Additional external load on supported surface induces state of horizontal stresses in column and surrounded soil. These stresses cause radial and indirectly - axial strain in GEC. Multiplicity of dependencies between stress and strain in considering materials is the reason why prediction of GEC behaviour is so difficult. Ability to predict the real GEC system parameters (like settlement, load redistribution, hoop forces, etc.) is the key issue for assessment of effectiveness of supporting system and safety of individual column.

Up till now only a few design methods have been developed for designing of geosynthetic encased columns. Existing methods omit some important aspects, that is why estimated system parameters (especially settlements) deviate from the measured values. In this dissertation a new mathematical description of GEC columns was made. Model allows to predict all GEC system parameters. Model has been verified by comparing predictions with measured values on large field investigation – supporting of deep organic layer under embankment of A2 Highway. Verification confirmed the thesis, that it is possible to predict settlement of GEC column with sufficient accuracy.

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