Abstract of the Dissertation

CALIBRATION OF NUMERICAL MODEL FOR GEOTECHNICAL DESIGN

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Responsible geotechnical design is an issue often complicated and requiring a lot of experience. Careful geotechnical recognition and in situ studies (Regardless of the type of structure) are very important as a basis for engineering calculations. At the same time due to the usual difficulties in the identification of soil properties, due to strong nonlinearities of the soils constitutive description and because of heterogeneity of the subgrade the safety factors affecting the design may attain considerable size. In this dissertation we present method that allows the engineer to overcome these difficulties by a careful adaptation of numerical tools used in the design to handle the current, individual geotechnical data. This is called a "calibration" of the numerical model.

Use of information emerging during excavation can be important especially for complicated ground conditions. Such cases are so important that can be considered as a method of design referred formally in the current version of the standard Eurocode 7. This approach is termed Observational Method and belongs to the group of active design methods. This method involves, among others, the observations from monitoring that explain better the behaviour of the subgrade. It allows for the design or selection of alternative solutions adapted to the observed behaviour of the structure. In relation to this, study uses an original program SheetPile and the method of Monte-Carlo simulation to identify the geotechnical parameters resulting from inclinometer measurements executed with the progress of construction. An attempt was made to the Artificial Neural Networks for this task, leading to the solution of the inverse problem for soil current parameters. The network was trained with the given measurements of structure displacements in relation to specific cases of steps of excavation work. Network output represented identified, selected geotechnical parameters of the individual layers.

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