

Interactions in reinforced bearing layers over partial supported underground

Interaction de couches de sol porteuses, armées, avec un sous sol qui par endroit ne cède pas

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ABSTRACT: Large - scale (1 : 3) model tests have been performed to evaluate the behaviour of horizontal geosynthetic-reinforced bearing layers (res. embankments) on soft subsoil supported partially by piles. The system has been applied often especially for highway and railroad embankments. Until now the system behaviour can be described analytically only by simplified geomechanical models - mainly its ultimate limit state. The most important test results are shortly presented and compared with the available commonly used dimensioning procedures.

RÉSUMÉ: Dans cette contribution sont présentées les résultats d'essais-modèles, qui ont été réalisés pour l'examen de l'interaction de couches de sol porteuses, armées, avec un sous sol qui par endroit ne cède pas, par ex. des pieux. Le système porteur, que l'on retrouve souvent pour la réalisation ou l'assainissement de barrages, digues, ne peut être décrit analytiquement que par un modèle simplifié. Une comparaison des résultats d'examen avec des modèles analytiques existants sont faits et sont notés les différences, respectivement les sources d'erreurs.

1 INTRODUCTION

The construction of fills on unstable underground is a common problem, e.g. the foundation of embankments on soft soil. Solving the problem e.g. by using high-strength horizontal geosynthetic reinforcement in the base of embankment has become common engineering practice, but suitable deformation behaviour often requires long waiting time for consolidation settlement. In recent years a new kind of foundation was established, where this disadvantage is nearly eliminated: the so called "piled embankments". Piles (or pile-similar elements) are driven in a regular screen disposition into the in-situ soil down to bearing soil, transferring the loads directly downwards and decompressing the soft soil significantly. Over the pile caps, a reinforcement by one or more layers of geosynthetics (mostly geogrids) is placed and above this the embankment will be provoked. The most efficient version of the system - with horizontal geosynthetic reinforcement - is described e.g. in John (1987).

During the last years the system has been successfully applied for important structures incl. sections of the German Railways by using high-strength geogrids. High bearing capacity and very low long-term deformations under traffic-loads have been registered, Alexiew et al. (1995), Gartung et al. (1996).