

## The Effectiveness of Prefabricated Vertical Drains for Accelerating Consolidation of Tunis Soft Soil

**Authors :** Marwa Ben Khalifa, Zeineb Ben Salem, Wissem Frikha

**Abstract :** The purpose of the present work is to study the consolidation behavior of highly compressible Tunis soft soil "TSS" by means of prefabricated vertical drains (PVD's) associated to preloading based on laboratory and field investigations. In the first hand, the field performance of PVD's on the layer of Tunis soft soil was analysed based on the case study of the construction of embankments of "Radès la Goulette" bridge project. PVD's Geosynthetics drains types were installed with triangular grid pattern until 10 m depth associated with step-by-step surcharge. The monitoring of the soil settlement during preloading stage for Radès La Goulette Bridge project was provided by an instrumentation composed by various type of tassometer installed in the soil. The distribution of water pressure was monitored through piezocone penetration. In the second hand, a laboratory reduced tests are performed on TSS subjected also to preloading and improved with PVD's Mebradrain 88 (Mb88) type. A specific test apparatus was designed and manufactured to study the consolidation. Two series of consolidation tests were performed on TSS specimens. The first series included consolidation tests for soil improved by one central drain. In thesecond series, a triangular mesh of three geodrains was used. The evolution of degree of consolidation and measured settlements versus time derived from laboratory tests and field data were presented and discussed. The obtained results have shown that PVD's have considerably accelerated the consolidation of Tunis soft soil by shortening the drainage path. The model with mesh of three drains gives results more comparative to field one. A longer consolidation time is observed for the cell improved by a single central drain. A comparison with theoretical analysis, basically that of Barron (1948) and Carillo (1942), was presented. It's found that these theories overestimate the degree of consolidation in the presence of PVD.

**Keywords :** tunis soft soil, prefabricated vertical drains, acceleration of consolidation, dissipation of excess pore water pressures, radès bridge project, barron and carillo's theories

**Conference Title :** ICGIGEA 2022 : International Conference on Ground Improvement, Geotechnical Engineering and Applications

**Conference Location :** Istanbul, Türkiye

**Conference Dates :** May 05-06, 2022