

# **VALORIZATION OF A HIGHLY PLASTIC SOIL IN EMBANKMENTS: FROM THE LABORATORY TO EXPERIMENTAL SITE**

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## **ABSTRACT**

The highly plastic clays are known to be quasi-impermeable and compacted materials with very slow variations of water content. These soils show frequently shrinkage and swelling phenomena as well as the stability. Their use in embankment is possible only in support of precise technical elements, defining their use and setting up conditions. They are considered as unusable materials for subgrads. In order to save natural resource (zero loan / zero landfilling objective), twelve partners including earthwork companies, consulting engineers, hydraulic binder producers, research laboratories and universities came together to work on a common research project christened TerDOUEST (French acronym for sustainable earthworks and structures based on treated soil) within the framework of the French National Research Agency (ANR).

In this project, taking place over the period 2008-2012, investigations in real size are led on an experimental embankment to study the possibility of valorizing highly plastic clays after treatments in different common earthwork applications: the base of flood embankment, the embankment body, the upper part of the earthworks and the subgrade. Regarding to predefined employments, two types of treatments were tested: only lime and a cement-lime mix. Both processes have the advantage of being simple, economical and environmentally friendly, they do not require in fact cutting operations or substitution. The experimental embankment, set up on April 2010, was constituted by half of highly plastic clay (type A4 according to French classification described in the NF P 11-300) and half of a conventional soil (loam, a lightly plastic soil according to NF P 11-300) considered as reference material for this study. The structure was set up using conventional means and materials arise directly from borrow pit of the construction site. The structure was instrumented and its monitoring is planned for several years.

Beforehand to the construction of the embankment, laboratory tests allowed us to obtain conclusive results regarding the mechanical strength of these treated clays on the short and long-term. The paper presents the results obtained in the laboratory and describes the construction of the experimental structure.