

Paper Number: 5092

Identification of expansive soils applied to land use planning in Montevideo, Uruguay

Huelmo, S.¹

¹Regional Professors Center, Independencia S/n, CP 94000, Florida, Uruguay, sebahuel@gmail.com

Uruguay is free of most of the worst natural hazards, but has areas with expansive soils, which is a geological risk producing major damage worldwide.

In Montevideo, areas with presence of expansive soils are associated with the silt-clay sediments of Libertad and Dolores formations [1] on which it sits more than half of the city. This phenomenon has caused damage on different buildings, so identifying these soils is important, in the territorial planning of the city, in order to avoid economic and social damage in the present and in the future.

The identification of areas in Montevideo (urban and rural) that are affected by the phenomenon of expansive soils was carried out in this work. For this purpose indirect methods based on the plastic properties (Atterberg limits) soil, which allow to set easily and potential expansion index and risk association, like applied by different authors (Chen ,1988 [2]; Seed, 1962 [3]; Holtz & Gibbs 1956 [4]; Dakshanamurthy & Raman 1973 [5]. The results were compared with results obtained by direct methods [6] (background) and damaged buildings checked in the study area.

Risk analysis has been applied on the growth corridors of the city using GIS, as result high-risk areas and very high aeras were identified on urban growth corridors in the north of the city

References:

- [1] Nahoum, B.; Prefumo, J. E.; Goso, C.; Chapuis, D.; Peyronel, S. 1996. La problemática de los materiales expansivos como fundación de construcciones livianas. Estudio de caso: formaciones Libertad-Dolores. 8 Congreso Brasileiro de Geologia de Engenharia. P. 215-226. Rio de Janeiro.
- [2] Chen, F.H. 1988. Foundations on expansive soils. Elsevier Publ., Amsterdam.
- [3] Holtz, W.G., Gibbs, H. 1956. Engineering properties of expansive clays. Transactions of the American Society of Civil Engineers, 121, 641–677.
- [4] Seed, H.B., Woodward, R.J. Jr, Lundgren, R. 1962. Prediction of Swelling Potential for Compacted Clays. Journal of Soil Mechanics and Foundation Engineering Division, ASCE, 88, 53–87.
- [5] Dakshanamurthy, V., Raman, V., 1973. A simple method of identifying an expansive soil, Soils and Foundations. Japanese Society on Soil Mechanics and Foundation Engineering 13 (1), 79–104.
- [6] Rostan, A.; Behak, L.; Musso, M.; Regusci, M.I. 2006. Caracterización de Subrasantes Finas Sedimentarias Potencialmente Expansivas del Sur de Uruguay. III Congreso Luso-Brasileiro de Geotécnica, COBRAMSEG, Curitiba (PR), Brasil, p. 215 – 219.

