

ABSTRACT

In this research a conceptual framework on the genesis of salt materials is described. Based on recently published works, the main deformational mechanisms are also explained. The objective of this work is the study of the compaction process of waste salt materials due their self-weight since it is placed in the tailing pile. Dissolution and recrystallization phenomena are developed as a consequence of confining stresses and the water presence. It produces bonding between salt grains increasing the strength of the material.

An experimental program was carried out on salt samples obtained from a tailing pile located at Súrria (Spain) in order to establish the mechanical behaviour of the material. The experimental research was divided in two stages. First, the geotechnical profile could be determined from a comprehensive laboratory characterization. In a second stage, the behaviour of the salt aggregates was studied by means of oedometer tests on compacted samples. The material used was obtained from two different depths. Samples were saturated during two months using a salt solution under isothermal conditions (23°C). Vertical stresses applied varied from 0,05 to 1,5MPa. Permeability measurements were obtained from oedometer tests (initial and final measurements) where a relationship between permeability and void ratio was established.

Finally, the experimental results were validated using the constitutive model developed by Chumbe (1996) for studying the mechanical behaviour of salt aggregates. The stress paths applied to each sample were modelled and numerical and experimental results were compared. Using this model, the strain velocity of the salt aggregates subjected to compaction under constant stress could be obtained. Moreover, the evolution of porosity and strength with time was also evaluated.