Properties of biomineralization process in various types of soil and their limitations

ABSTRACT

Weak and problematic soils affect stability and safety of structures founded on them. The problems occur due to limitation or absence of shear strength or over shear stress applied on the soil during loading which then lead to large settlement and consequently failure to the founded structures. Replacing the soil with better materials would be very costly as these types of soil are normally extended to a great depth under the ground surface. The proposed solution for such kind of soils is curing weak soils instead of replacing them. One of the proposed treatment methods is bio-grouting in which the conditions and the scales of the application differs according to the soil types and limitations. Reviews on previous researches have shown that treatment results by bio-grouting method are controlled by several factors , such as size of pores, value of pH, duration of treatment, presence of water and electro-kinetic effect, which give impact to treatment results quality and quantity. The outcome can go as far as killing the bacteria which then reduce the microbial growth if it was not controlled. Understanding of bio-grouting process and its application will help in improving the engineering properties of the weak soils and its applications.

Keyword : Bio-grouting; Biomineralization; Electro-kinetic treatment; Soil improvement; Soil treatment; Soft marine clay