

عنوان مقاله:

Experimental study on foamed sandy soil for EPBM tunnelling

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خلاصه مقاله:

Foam injection is becoming a standard conditioning agent when tunnelling with an earth-pressure balanced shield, resulting in an increasing interest in this technique. The technique is mostly based on empirical rules and experience. To be able to determine what foam and how may foam has to be injected for different soils, it is necessary to know the mechanical parameters of the foam-water-soil mixture. This paper describes a comprehensive set of tests that has been performed to evaluate the effect that foam, foam types, and foam parameters have on the shear strength of sandy soil. Four different foam agents and one type of polymer were used during the tests. The foam production process was performed by a foam generator, which was constructed by the authors. Shear strength tests were carried out in a conventional direct shear box measuring 60x60 mm. The test results show a decrease in the internal friction angle and an increase in soil compressibility for foamed soil, where the changes are functions of soil gradation, foam types, and foam parameters. It appears that another agent (such as bentonite slurry) needs to be added to coarse-grained soils to condition the soil effectively by increasing the fine content and reducing the number of large voids. The test results also show that the effect of different foaming agents on the shear strength of fine sand is not noticeable.

کلمات کلیدی:

EPBM, Foam, Polymer, Shear strength, Dilation

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