عنوان مقاله:

Strength Characteristics of Clay Mixtures with Waste Materials in Freeze-Thaw Cycles

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خلاصه مقاله:

Waste tires, rubbers, plastic and steel materials, normally produced in every society, enter the environment and cause serious problems. These problems may, to some extent, be reduced by finding applications for them in engineering, for example, they can be used for geotechnical applications as backfill material and solving problems with low shear strength soils. Such materials may be subjected to freeze-thaw cycles, resulting in strength reduction. Freeze–thaw cycling is a weathering process which is normal in cold climates. In these cycles, thermodynamic conditions at temperatures below 0ºC cause translocation of water and ice which can change the engineering properties of soils. The present study investigates the effect of reinforcing soil with tire chips and steel fibers to reduce the effects of freeze- thaw cycles. To this aim, reinforced kaolinite clay was compacted in the laboratory and exposed to a maximum of 6 closed-system freeze- thaw cycles. The results of the study reveal that adding tires to clay prevents strength reduction due to freeze-thaw cycles. The soil samples which were mixed with 2% of steel fibers and 10% of tire chips were not affected by the freeze and thaw cycles as the pure samples were. These materials can reduce the effects of freeze and thaw cycles especially in cold regions.

کلمات کلیدی:

Freeze thaw cycles; Tire chips; Steel fibers; unconfined strength; Clay