Enhance the Soil Characteristic to Resist Erosion Using Polymer Additive

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Surface erosion can exert a tremendous impact on natural resources and can cause serious economic losses because of blocked streams, degraded water quality, destroyed bridges and roads rights-of-way, ruined spawning sites, lowered soil productivity, and property damage. Soil properties important in the evaluation of a site for its resistance to erosion include particle size, permeability, water retention characteristics, compressibility, shear strength, void ratio or porosity, shrink-swell potential, liquid limit and plasticity index. Soil erosion control techniques have the potential to reduce runoff and soil loss. Traditional stabilizers such as lime cement, fly ash and bituminous materials, etc., usually require long curing time. Hence now a day, polymer stabilizer is used more extensively because of its stable chemical property and shorter curing time. To evaluate the possibility of a sustainable erosion stabilization as alternate to the traditional concepts (e.g. marl), the technology of polymers and their role within the stabilization process is presented in this paper. Findings of numerous studies revealed that the addition of polymer to the natural soils produced an improvement in its mechanical capacities, namely, enhancements in unconfined compressive strength, California bearing ratio, and shear strength, whereas, the strength of the stabilized soil is significantly increased both under wet and dry conditions. In order to further evaluate and confirm the sustainability and advantages of the polymers for erosion stabilization, few projects that have been undertaken in the Kingdom of Saudi Arabia having the objective of increasing the resistance of soils to wind and water erosion are further evaluated herein for identifying the possibility of altering from the traditional erosion design into this more sustainable and economic solutions.

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