
Stabilization of Clay Soils Against Erosion Loss

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Abstract: Accelerated soil erosion from construction sites and the resulting increase in downstream sediment load constitute a significant environmental problem. Laboratory studies indicate that small percentages of hydrated lime or of Portland cement will stabilize clay soils against rainstorm erosion by preventing particle detachment. Coordinated measurements of the size distribution of water-stable aggregates, of pore size distribution by mercury porosimetry and of microstructure by scanning electron microscopy and energy dispersive X-ray spectrometry were used to clarify aspects of the mechanisms responsible for the development of erosion resistance. Attainment of such resistance was marked by aggregation of a significant part of the clay into water stable aggregations of the order of several mm in size and of minimal change in porosity and pore size distribution on exposure to the test rainstorms. At least some of the clay particles in the aggregations appeared to be partly converted to calcium-bearing reaction products and formation of the "reticulated network" variety of calcium silicate hydrate gel linking adjacent particles was demonstrated.

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