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Surficial Soil Stabilization

Experiment in Biogeotechnical Engineering

How can we prevent damage due to soil erosion?

Surface soil particles are held together by various organic substances that act like a protective glue. When soils are disturbed (by humans, animals, wind, rain, etc.), the “glue” can be broken-up or washed away. Disturbing this top layer increases soil erosion, and can add large amounts of dust to the air and unwanted soil into our water. Airborne dust is an environmental pollutant that can be hazardous to human health and safety, and excess soil erosion can contaminate our drinking water.

What if we could find a natural way to stabilize surface soils by reforming a protective glue that can reduce erosion and dust? CBBG engineers and scientists are researching ways to add environmentally friendly materials, found in nature, to soil in order to help prevent the damaging effects of soil erosion.

Try this Hydrogel Experiment at home!

1. Purchase hydrogel (sodium polyacrylate, pronounced “poly-ak-rill-ate”):
2. Add 1/8 teaspoon of sodium polyacrylate powder into a clear plastic cup.
3. Slowly add water to the powder while gently stirring with a disposable spoon or fork until you notice a major change. Is the mixture a solid or a liquid? What does it feel like? How might adding a similar ingredient to soil make it more stable?
   (Optional) Add food coloring to the water.

   Safety Note:
   Water gel is non-toxic. Dispose of gel in the trash, not the sink.

Before: Loose, “unglued” sand (notice it just falls out of the cup)

After: Sand surface is treated (“glued”) by hydrogel