

Methods to stop moving soil

Erosion steals the Green

Industry's lifeblood, soil.

Here are some materials to minimize erosion's damage.

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Bare soils are vulnerable to soil erosion, particularly on steep slopes and long, uninterrupted slopes. Silty soils, fine sandy soils, soils low in organic matter and soils with an impermeable subsoil layer erode easily.

The loss of topsoil, organic matter and soil elements isn't the only effect of erosion. It makes slopes unstable, creates rills and gullies, and deposits soil in lakes, ponds and reservoirs. This limits the ability of vegetation to establish and worsens water quality.

Water can carry particles of soil in suspension. The faster the flow of water, the larger the particles that can be transported. The movement of water following the ice age provides extensive evidence of the power of water to transport and deposit large materials. In comparison, the meandering, twisting path of a river controls its erosive ability by slowing the speed of water flow, and reducing the size of particles that can be transported. The steeper the slope and the straighter the stream bed - the faster the flow of water and the greater the capacity for soil transport.

Even the simple action of raindrops has powerful erosive capabilities. An individual drop of rain may not seem serious but, when occurring in multiples, as precipitation tends to do, the effect can be devastating. Merely by dislodging a particle of soil,



Correct installation of materials is essential for successful control of soil erosion. Heavy spring rains devastated this newly planted roadside even though a fabric covered it.

the rate of erosion is sped up by releasing that particle for movement.

Slowing the movement of water is essential when dealing with site disturbance. Stripping a slope of plant materials or creating a slope composed of exposed soil, even temporarily, can be quite destructive.

There are many materials and methods available for slowing water movement, at least one of which is suitable for any slope maintenance situation.

Mulch resists erosion

Placing mulch materials helps mitigate erosion by reducing the direct impact of precipitation. Used in conjunction with seeding, mulch aids in establishment by conserving moisture and creating favorable conditions for seed germination when suitable application rates are used. Mulch materials include straw, hydromulch applications of wood cellulose fiber, or even wood chips, as well as

mulch matting.

Straw mulch provides good site protection and encourages plant growth. Straw is effective both in absorbing raindrop impact and in moderating the soil surface climate. Straw is inexpensive but must be anchored to keep it from blowing away. Fire hazard, weed growth and cleanup cost should also be considered.

Wood fiber, although not as effective as straw, is a weed-free, low-fire-hazard mulch and may require less labor to apply. Wood fiber will provide almost complete ground cover but does not have enough mass to absorb the energy of raindrops and flowing water. Wood fiber should be considered in situations where slopes are 2:1 or steeper; where vehicle access is limited to >50 feet (15 m); where weed growth or fire hazard may be a concern; or where mulch must be applied on a windy day.

Mulch can be lost from wind or runoff and should be anchored where slope or wind action may affect its usefulness. For straw, mechanical crimping or a tackifier such as asphalt emulsion or wood cellulose fiber are necessary. (A tackifier sets to form a protective skin which bonds to the earth yet allows penetration of moisture and subsequent growth of seed.) The use of mulch netting must also be considered to keep mulch in place on steeper slopes or where concentrated water flows occur.

Matting another option

Mat materials such as excelsior or jute, matting are used to stabilize easily eroded areas, while vegetation is being established. Consider matting for small sites in urban areas, steep slopes, highly erosive soils or where difficulties with vegetation establishment are possible. Matting isn't generally used alone but in conjunction with seeding.

Dense mats hold soil in place, absorb water and hold it near the soil surface. Less dense mats, such as chicken wire or plastic mesh, will hold applied mulch materials but will not provide any soil protection themselves. Mats must be installed with complete contact with the soil, otherwise

erosion can occur below. A layer of straw underneath a fabric increases effectiveness.

Two common matting products are Erosion Control Blankets (ECBs) and Turf Reinforcement Matting (TRM). ECBs are generally made up of natural fiber materials such as coconut fiber, excelsior or wood products, or jute yarn, and they are usually biodegradable. These products hold seeds and soil in place until vegetation is established. They also protect the soil surface from water and wind erosion and offer shade and heat storage, thus creating ideal conditions for seed germination. ECBs are commonly used on steep slopes, low flow channels and as a flexible bioengineering textile.

Turf reinforcement mats

Turf reinforcement mats are similar to ECBs, but also capture soil, to fortify or building up existing earth. TRMs are usually made from synthetic polymers or other durable manmade materials. They're used in stormwater channels, dams and dikes,



PHOTO COURTESY NORTH AMERICAN GREEN

Inexpensive straw mulch is often used with netting to increase the success of erosion control on some projects.

banks and shorelines, retention and detention basins and on steep slopes or swales. Although matting can be expensive, it is available in many different grades.

Hydroseeding valuable tool

In hydroseeding a slurry of water, mulch, seed, fertilizer and tackifier are applied together. Additional erosion control materials may also be included in the mix. The speed of application, particularly for large and or steep areas, can be an effective method to reduce soil erosion except in areas of point source discharge or concentrated water flow. In these situations, additional steps, such as the application of straw or the placement of mats, to further stabilize the slope and retain seed, may be appropriate.

Vertical mulching

In dry climates, hydromulching, or tackified or crimped straw may not be as effective as they are in areas with more seasonal moisture. In some cases, where moisture or irrigation is limited, vertical mulching may be a suitable technique. The placement of upright straw, sticks or brush upright in the soil will slow water movement, provide channels for water penetration, trap seeds and dust, shade and cover seedlings, and provide organic matter to the soil. Broom corn, straw, brush and reeds are suitable materials. **LM**



PHOTO COURTESY CALIFORNIA STRAW WORKS

Straw wattles can be used on steep slopes with low visual requirements to slow water movement. Soil particles are deposited, allowing vegetation to become established and stabilize the slope.