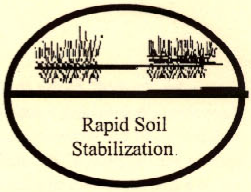
7 Mulches



Description/Goals

Mulches, which are chopped up organic material, have two purposes on construction sites. They are used to protect seeds from erosion, moisture loss and animals (e.g., birds and small mammals) and are used alone when seeds cannot be established, such as outside the growing season (See Fact Sheet 6). Mulches are extremely effective at reducing suspended solids, with efficiencies in the 80% and 90% range and are popular among developers because they are low cost and easy to apply.

Techniques

The three conventional mulches are straw (or hay), fiber and wood chips. Straw or hay mulches are made of dried grains such as wheat (straw) or dried grasses (hay). These mulches can be applied by hand, or using the faster, less expensive straw blower- a machine that shoots pieces of straw or hay over the soil surface.

Straw mulches do not generally bond to the soil, so they can be blown off the site or carried away by overland flow. Consequently, they

Mulching Alternatives	
Type	Description/Uses
Straw or Hay	Straw or hay surface applied at 2 to 4 tons per acre Mechanicall; or chemically secured to the soil surface Provides the densest cover to protect seeds and soil
Wood Fiber	Chopped up fibers (usually wood) applied to the soil surface with a hydroseeder Tackifier is not always necessary, but can be applied with fiber, seeds and fertilizer in one step Best use is in combination with fast-growing seeds
Compost	Efficiency on par with wood fiber Compost acts as a soil amendment Can act as a longer-term control (up to three years) Expensive compared with other mulches (about $1/square yard)
Wood Chips	Use of wood chips as a mulch Effective when applied as high levels (about 6 tons/acre) Can actually save money if on-site materials are used Effective on up to 35% slopes

Source: ***Watershed Protection Techniques*** **Vol. 2 #3**

Approximate Cost: $.25 -$.35/sy*

* Straw mulch applied with a straw blower and chemical tackifier

Effectiveness

	Low	Mod	High
Erosion/ Sediment Control			✓
Long-Term Pollutant Reduction	✓		
Habitat / Stream Protection	✓		

Ease of Application

	Difficult	Average	Easy
Installation			✓
Maintenance		✓	

Limitations

- Steep slopes
- Severe storms

need to be "tacked" to the surface. They can be held in place through spraying a tackifier (glue) or a fiber mulch to hold the straw in place. Two mechanical options are to "punch" the straw into the soil with the use of a tractor-drawn implement or to hold the mulch in place using twine held in place by pegs placed at the edge of the straw. Straw mulches can be used alone or in combination with grass seed.

Fiber mulches are chopped up paper or wood fiber, and should only be used in combination with seeding or as a tack for straw mulch. Fiber mulches can be applied using a hydroseeder (See Fact Sheet 6). Mulch, water, a chemical or organic tackifier, fertilizer, grass seed, and lime can all be applied to the soil in one step. Wood chip mulches are rarely used because of their expense and because they need to be hand-applied. An alternative is the use of "on-site chipping," where trees and underbrush from a cleared area are chipped and used as mulch. Mulch is also valuable for permanent landscaping or bioretention areas.

Limitations/Challenges

Mulches can be used on most sites, but are somewhat limited on steep slopes. Straw and fiber mulches are generally recommended for 3:1 or flatter slopes, but wood chip mulch can be used on slopes as steep as 1.5:1. None of these methods should be used to stabilize channels or other areas of concentrated flow. Erosion control blankets or mats are more appropriate for these areas (See Fact Sheet 9).

Sediment Removal Efficiency of Mulches

Mulch	Sediment Reduction (%)
Straw (1.25 tons/acre)[1]	93.2[a]
Straw (2.0 tons/acre)[2]	89.3[b]
Fiber mulches (about 1.0 tons/ac)[3]	65.0-97.1[b]
Fiber mulch (at least 1.0 tons/ac; 3% tackifier)[4]	91.8[c]
Fiber mulch (1.25 tons/ac; fertilized, seeded)[1]	89.1[a]
Fiber mulch (1.25 tons/ac; fertilized, seeded, 90 gal/ac tackifier)[1]	85.9-99.1[a]
Mixed yard debris (410 cy/ac)[4]	95.0[c]
Compost (410 cy/ac)[4]	85.9[c]

[a] TSS load reduction [b] Soil load reduction [c] TSS event concentration reduction
[1] 24% slope gravelly sany loam for 13 storms over two Washington winters. (Horner et al., 1990)
[2] 9% slope silt loam soil. Subected to a 5.8", one hour storm. (Harding, 1990)
[3] 30% slope clay loam . Subjected to a 3.1", ½ hour simulated storm (Wall, 1991)
[4] 34% slope clay cap and top-soil mixed slope. Five March Oregon storms (W+H Pacific and CH2M-Hill, 1993)

Source: *Watershed Protection Techniques* Vol. 2 #3

Innovations/Improvements

Recently, compost has been investigated as a mulch for construction sites. According to W&H Pacific and CH2M-Hill (1993), this method is comparable to fiber mulches for reducing erosion. Since the method uses yard compost, it conserves resources. Also, the nutrients and organic matter in yard compost can enhance the soil. One disadvantage is that "chunks" of compost can be eroded off site; this technique should be used in conjunction with a silt fence (See Fact Sheet 11) to trap organic matter. Yard compost is also expensive compared to traditional mulches (about $1/sy).

Mulch Suppliers

Eastern Products, Inc.
Mahwah, NJ
(201) 934-5050

Verdyol, Inc.
Pell City, AL
(205) 338-4411

Weyerhauser Co.
Snoqualmie, WA
(800) 443-9179

For more information contact the International Erosion Control Association at (800) 455-4322 or ask your county Soil and Water Conservation District about local suppliers.

References

Harding, M.V. 1990. Erosion Control Effectiveness: Comparative Studies of Alternative Mulching Techniques. IN: Environmental Restoration : Science and Strategies for Restoring the Earth. Island Press, Covello, CA. 149-156.

Horner, R.R., J. Guedry and M.H. Kortenhog. 1990. *Improving the Cost Effectiveness of Highway Construction Site Erosion and Pollution Control*. Washington State Transportation Center. Federal Highway Administration. Seattle, WA. 79 pp.

W&H Pacific and CH2M-Hill. 1993. *Demonstration Project Using Yard Debris Compost for Erosion Control*. Portland Metropolitan Service District. Portland, OR. 90 pp.

Wall, G.J. 1991. *The Effectiveness of Surficial Erosion*