Article 55

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Keeping Soil in Its Place

Perhaps the most critical stage at a construction site is when soils are exposed both during and after clearing and grading. Erosion of these exposed soils can be sharply reduced by stabilizing the soil surface with erosion controls. For many contractors, erosion control is just shorthand for hydroseeding. However, a wide range of erosion control options are available, including mulching, blankets, plastic sheeting, and sodding, among others.

In this article, the performance, costs and constraints of these often-confusing erosion control options are compared. Guidance is provided on when each method should be used or avoided. In addition, the article outlines options for effective erosion control under challenging site conditions, such as the non-growing season, steep slopes, drought, concentrated flows, stockpiles and poor soils.

Effectiveness of Erosion Controls

Four recent studies evaluated the effectiveness of 15 erosion controls (Table 1). With a few exceptions, suspended solids load reductions were on the order of 80 to 90%. This suggests that erosion controls are extremely effective, when compared to the 60 to 70% sediment removal typically reported for most sediment controls.

Benefits of Erosion Controls

Erosion controls have benefits beyond controlling erosion. First, they can improve the performance of sediment controls. Controlling erosion reduces the volume of sediment going to a sediment control device. Consequently, less treatment volume is reduced by sedimentation and "clean out" frequencies are lower. In addition, many erosion controls can lower surface runoff velocities and volumes, preventing damage of perimeter controls.

Table 1: Sediment Removal Efficiency of Surficial Erosion Controls

Erosion Prevention Techniques	Sediment Reduction (%)
Straw (1.25 tons/ ac)[1]	93.2[a]
Straw (2 tons/ ac)[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)[4] 3% tackifier	91.8[c]
Fiber mulch (1.25 tons/ ac)[1] fertilized, seeded	89.1[a]
Filber mulch (1.25 tons/ ac)[1] fertilized, seeded 90 gal/ac tackifier	85.9 - 99.1[a]
70% wheat straw/30% coconut fiber blanket[2]	98.7[b]
Straw blankets[3]	89.2-98.6[b]
Straw blanket[1]	92.8[a]
Curled wood fiber blanket[1]	28.8[a]
Curled wood fiber blanket[3]	93.6[b]
Curled wood fiber blanket[2]	93.5[b]
Jute mat[1]	60.6[a]
Synthetic fiber blanket[1]	71.2[a]
Nylon Monofilament blanket[2]	53.0[b]
Mixed Yard Debris (410 cy/ac)[4]	95.0[c]
Leaf 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 sandy loam for 13 storms over two Washington winters. (Horner *et al.*, 1990)
[2] 9% slope silt loam soil. Subjected to 5.8", one hour simulated storm. (Harding, 1990)
[3] 30% slope clay loam soil; subjected to 3.1", 1/2 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)