Article 56

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Strengthening Silt Fence

Silt fences are one of the most widely used and misused erosion and sediment control practices. Recent data suggest that they can perform well under some circumstances. In addition, their cost-effectiveness continues to make them a popular ESC technique. Unfortunately, silt fences are often used inappropriately or are improperly installed or maintained, resulting in poor performance. Simple improvements to the standard silt fence, as well as some innovative designs, can help to improve the current state of silt fences.

How, and How Well, Do They Work?

Silt fences trap sediment in construction runoff before it washes into the street, a neighboring property or, in the worst case, a nearby stream or wetland. As sediment-laden runoff flows through the silt fence, the pores in the geotextile fabric filter out sediment particles. In reality, settling is actually the most important sediment removal function of silt fences (Kouwen, 1990), since runoff is detained behind the fence, giving sediment time to settle out.

Three recent studies report sediment removal efficiencies ranging from 36 to 86% (Table 1). It is almost impossible to accurately predict the field performance of silt fences because relatively little research has been done, and the results are so variable. This being said, some useful information emerges from available data. First, these studies suggest that silt fences are more effective at removing coarser-grained materials. Conversely, silt fences are ineffective at reducing turbidity, which is disproportionately influenced by finer particles (Horner *et al*., 1990). A second finding is that silt fences are less effective on steeper slopes.

Table 1: A Summary of Recent Performance Monitoring of Silt Fences

Study	Parameter	Efficiency	Description of Study Site
W&H Pacific and CH2M-Hill (1993)	TSS Turbidity	36%[a] -4.7%[a]	Average removal efficiency for five storms in March of 1993. Plot is on the 34% slope of a landfill. Soil is clay cap mixed with topsoil. Plot of bare soil is 32' by 9'.
W&H Pacific and CH2M-Hill (1993)	TSS Turbidity	65%[a] -1.5%[a]	Same study as above, but the test site is a 42% graded embankment with thick brown clay soil.
Horner *et al.* (1990)	TSS Turbidity	86%[b] 2.9%[a]	Construction site stockpile with a 24% slope. Gravelly sandy loam soil. Thirteen storms recorded over two winters on a 36' by 9' test plot.
Wyant (1993)	TSS	75%[c]	Efficiency determined by calculating sediment in a silty soil that will not settle after 25 minutes.

a. Efficiency calculated as the average removal for all storm events
b. Efficiency in reducing total loading for all storm events
c. Theoretical maximum for silty soils based on settling rates