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Temporary Barriers as BMPs, Revisited

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The use of temporary barriers for sediment control on construction sites is not new phenomenon. Virtually all permitting and regulatory agencies that oversee construction activities, from the USEPA to small municipalities, have approved a variety of temporary sediment barriers as best management practices (BMPs). The American Society for Testing and Materials (ASTM) and the Erosion Control Technology Council (ECTC) have been developing standard test methods to evaluate the performance and design of these BMPs so designers and regulatory professionals can make informed decisions when choosing products and practices.

The article "Temporary Barriers as BMPs,"which appeared in the November/December 2009 issue of *Erosion Control,* aptly describes how important effective erosion and sediment control site design is to protecting receiving waters. For example, there is no substitute for soil erosion prevention, whether provided through effective erosion control practices, strategic project phasing (as advocated by the new USEPA Effluent Limitation Guidelines), or green space preservation (as advocated by LEED Certification for Green Buildings and low-impact development guidelines). Additionally, construction site erosion and sediment control should follow a treatment train design approach, whereas no single product or management practice will be very effective at reducing sediment discharges from a disturbed soil environment. Temporary sediment barriers are no exception to this rule, as all purveyors and users of these products should understand. However, a growing body of peer-reviewed research literature suggests that when designed, installed, and maintained appropriately sediment barriers can be very effective in reducing runoff sediment, including suspended solids fractions (Faucette et al. 2005, Keener et al. 2007, Faucette et al. 2008, Faucette et al. 2009a, Faucette et al. 2009b, Faucette et al. 2009c) .

While the article does raise real concerns regarding design of sediment barriers, the assumptions identified to generate design criteria require clarification. While it is true that 100% containment of runoff will also contain 100% of all transported pollutants, including sediment, these barriers are not intended or designed to be distributed impoundment systems or miniature sediment ponds, thereby blocking or permanently containing all surface flow. Typically, these technologies have an appreciable flow-through rate, which creates less ponding and standing water, and reduced incidence for overflow. Additionally, these barriers, as well as most erosion and sediment control practices, are not designed to withstand rain events greater than a 24-hour, 2-year return, e.g. flood flow events. It should be noted that designers typically consider overflowing barriers as properly functioning management practices, if the design storm event is exceeded. The degree of overflow, not the incidence of overflow, of these barriers dictates how far from 100% effective they may be at reducing sediment transport from the site.

It is important for the research community and manufacturers to develop spacing requirements for these temporary sediment barriers; however, the equations developed for spacing requirements need to include hydraulic flow-through rates, a critical component in determining overflow potential and therefore the spacing or height requirement for these practices. If the sediment barrier practice has no hydraulic flow through rate, then the assumptions, and therefore the equations and design presentation, presented in the article would be accurate. For example, a study conducted by Ohio State University and recently published in the *Journal of Environmental Quality* concluded that compost sock barriers have an average 50% greater hydraulic flow through rate, relative to silt fence, and that ponding height can be as much as 75% less for this technology relative to silt fence under similar runoff conditions (Keener et al. 2007). Research engineers concluded that sediment barriers with greater hydraulic flow-through rates, thereby generating less ponding, do not need the same height requirement *or* may be spaced further apart, relative to silt fence. It should also be noted that the researchers concluded that increased flow-through rate did not come at the expense of sediment removal efficiency, signifying that these practices combine filtration *and* sediment deposition principles to remove sediment from storm runoff.

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In conclusion, the article does raise interesting questions about how we design our sediment control barriers and the need to develop design criteria for these practices. It is evident that simply adopting design spacing and height specifications associated with silt fence is not appropriate for tubular sediment control barriers, which often have very different hydraulic flow-through characteristics. These performance characteristics need to be researched and reported so accurate design criteria can be disseminated to design and regulatory professionals.

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