

Investigation of the Ability of Filters to Stop Erosion through Cracks in Dams

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(ABSTRACT)

The ability of a filter to stop erosion through cracks in the core of an embankment dam requires that the filter be graded so that it will restrain movement of particles from the core, and that the filter be truly cohesionless, so that it will not crack even when subjected to the same types of deformations that cause cracks in the core.

To achieve resistance to cracking, most current filter criteria require that the filter should contain no more than 5% of material finer than the #200 sieve, and that this fine material should be non-plastic. This research study was conducted to investigate whether these specifications do, in fact, result in filters that can be relied upon to slump, fill cracks, and prevent interval erosion in embankment dams.

The research study involved filter erosion tests using a 4-inch diameter device and a 12-inch square device, and "sand castle" tests to investigate the tendency for candidate filters to slump when immersed in water. These tests showed that conventional filter criteria – no more than 5% fines, and fines that are non-plastic, are conservative. The research study showed that even filters with 5% of highly plastic fines are able to slump, fill cracks, and prevent erosion.

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