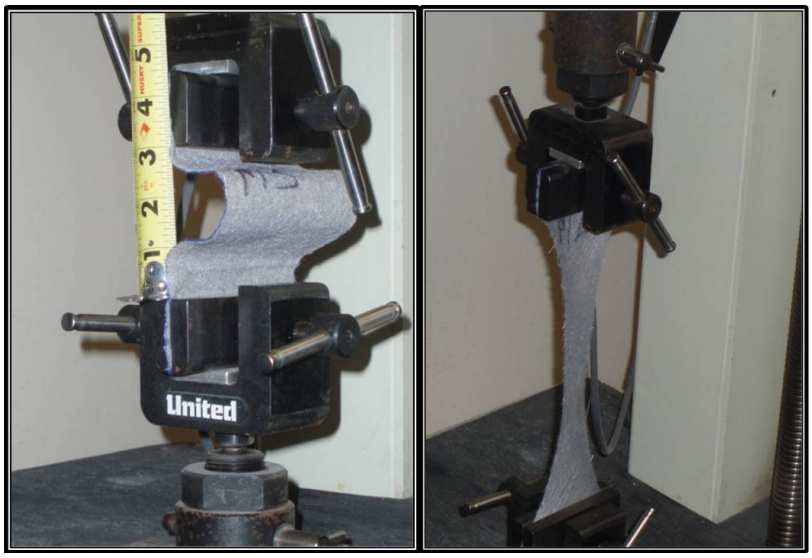
Florida Department of Transportation Research

Index Testing to Support the Stormwater Management Erosion and Sediment Control Laboratory
BD521-05

According to the Environmental Protection Agency, soil erosion is believed to be the biggest contributor to nonpoint source pollution in the United States. Eroded sediments in stormwater impair ecosystems and require costly remediation. The prevention of soil erosion is the first line of defense against sediments entering water bodies.

The University of Central Florida's Stormwater Management Academy studies the impacts of stormwater runoff using a rainfall simulator. Academy researchers have established a support facility, the Erosion and Sediment Control Laboratory, to enable the index testing of erosion and sediment control products and soils in a laboratory environment. They recently tested silt fence materials used as temporary barriers to control sheet flow from disturbed lands, and polyacrylamides (PAMs), polymers added to soil that increase soil particle cohesion and reduce erosion.



BSRF, a non-woven geotextile, undergoing a grab test at the Stormwater Academy's Erosion and Sediment Control Lab

BSRF is a non-woven geotextile supported by wood posts and designed to improve the performance of silt fences. Researchers conducted tests on both the new BSRF product and the existing industry accepted product called Type III, according to American Society for Testing and Materials (ASTM) and/or American Association of State Highway and Transportation Officials (AASHTO) standard testing methods for tensile strength, puncture resistance, apparent opening size, and permittivity. They also compared test results to the manufacturer's published values and/or FDOT minimum requirements.

Researchers found that both silt fence products meet the minimum recommendations of FDOT and ASTM for grab strength, permittivity, and apparent opening size. Researchers concluded that further tests should be conducted on the performance of silt fences using the rainfall simulator's erosion beds to evaluate structural stability, flow rate, and filtration capability.

Researchers also conducted index tests on polyacrylamides to determine the most effective application dosage. Polymers have been found to be effective at controlling erosion because they increase the cohesion of soil particles, thereby bonding small soil particles together, decreasing their transportability, and helping particles to settle. Researchers conducted tests on PAMs to determine performance and toxicity, and to determine effectiveness in reducing turbidity.

Researchers found that proper dosage of PAMs can be determined for a site and, based on the dosage level and filtration, residue of PAMs in discharge water is expected to be of minimal toxic effect. Researchers caution, however, that without proper filtration, PAMs could be toxic to aquatic life. They conclude that additional dosage and toxicity tests with PAMs and other polymer products are needed to establish the relevant safe dosage concentrations.

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For more information, visit http://www.dot.state.fl.us/research-center