



SEDIMENT AND EROSION CONTROL LABORATORY

The Texas A&M Transportation Institute's (TTI) Sediment and Erosion Control Laboratory (SEC Lab) provides the transportation industry with a research and performance evaluation program for roadside environmental management. Research at the SEC Lab includes stormwater quality improvement, erosion and sediment control, and vegetation establishment and management.

TTI's Environment and Planning Program operates this 19-acre, full-scale, indoor/outdoor facility. Demand for the facility has steadily grown for over 20 years, necessitating the recent expansion to meet the industry's research needs. With

funding from the Texas Department of Transportation (TxDOT), TTI produces and maintains the TxDOT Approved Products List (APL) for all sediment and erosion control products used by TxDOT on Texas roadsides. The lab has three major research and performance evaluation components. In addition to this equipment, the SEC Lab also houses a 2,800-square-foot climate-controlled greenhouse, small footprint stormwater quality structure, index testing laboratory, bench-scale testing capabilities, 65-foot concrete flume, 1,000 linear feet of 25-foot tall soil embankment built with 2:1 and 3:1 slopes per highway specifications, and 10 at-grade channels 85 feet in length.



SEC Lab Expansion

To expedite product and device performance evaluations and to enable additional research and development, the SEC Lab underwent a major expansion, which was completed in September 2013. The expansion includes a building with three, independently operated indoor rainfall simulators, 1,500 square-feet of covered preparation area, and a 40-foot by 60-foot soil storage building to maintain consistent antecedent soil moisture, a critical factor in the indoor testing procedure.

Indoor Rainfall Simulators

The indoor rainfall simulator facility consists of two buildings, the facility built in 2000 and the 2013 facility expansion, both joined by the covered preparation area. The 2000 rainfall simulator has two 6-feet by 30-feet soil fill test beds. The 2013 expansion includes three 8-feet by 40-feet soil fill test beds; however, the 2013 structure will accommodate the smaller test beds as well. All of the rainfall simulators can adjust to match any desired slope up to 1.5:1 and accommodate any type of soil fill for research and product performance evaluation. The 2000 facility was also modified

to expedite testing. The building was originally designed for manual sediment collection. In 2012, the sediment collection pits were expanded to enable the use of larger collection devices to reduce the amount of time required to complete the performance evaluation cycle. To handle the larger loads, a 4-ton overhead bridge crane was installed.

The rainfall simulators provide water drop size distribution and impact velocity that are typical of storms common to Texas

and the Gulf Coast regions of the country. The rainfall simulators are designed to subject test beds to the greatest, most destructive rainfall characteristics. Almost all of the water droplets reach 90 percent terminal velocity before soil impact. Rain is dropped from a height of 14 feet, causing the speed and erosive force of the water to approximate some of the velocity most severe rainfall properties. The rainfall simulators can produce up to 9 inches per hour. The 2013 facility design includes performance evaluation capabilities to ensure compliance with ASTM standard test methods.



About TTI

The Texas A&M Transportation Institute, established in 1950, seeks solutions to the problems and challenges facing all modes of transportation. The Institute works on over 700 research projects with over 200 sponsors in the United States and abroad at all levels of government and in the private sector. TTI is recognized as one of the finest higher-education-affiliated transportation research agencies in the nation. TTI has saved the state and nation billions of dollars through strategies and products developed through its research program. TTI research has a proven impact — resulting in lives, time and resources saved.



Sediment Retention Device Flume

The TxDOT 2014 Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges now requires the performance evaluation of sediment retention devices (SRD) before use on TxDOT rights-of-way. TTI developed the SRD performance evaluation program for TxDOT in 2010 and is currently producing an APL for SRDs similar to the established program for erosion control products. The SRD flume consists of a 12-foot upper flume and a 2-foot lower flume with a 4-foot soil-filled section between installed with the SRD test material. The 1500-gallon reservoir mixes the well-graded slurry of artificial sediment. Turbidity and flow meters continually monitor influent and effluent concentrations to determine product performance.

Variable Slope Channel Flume

The 30-foot outdoor variable slope channel flume is used for evaluating the performance capabilities of flexible channel liner materials at a range of shear stress flows. The current protocol evaluates products and materials up to high stress flow of 12 psf (575 Pa).

Future of the SEC Lab

The SEC Lab expansion includes ASTM testing capabilities that will expand opportunities for product performance evaluation. This expansion will result in continued long-term benefits to not only TxDOT, but to other state DOTs and the sediment and erosion control industry.

TTI's Mission

To solve transportation problems through research, to transfer technology and to develop diverse human resources to meet the transportation challenges of tomorrow.

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