SRWs Seek Green Light for Highway Use

Travel across the United States by highway and you'll notice retaining walls of all types. These walls serve a supporting role in providing safe routes of transportation. The importance of the structural integrity of walls in transportation applications is best measured by the value of the lives they help protect.

Currently, the majority of walls built for department of transportation (DOT) projects rely on one of three methodologies — rigid concrete gravity walls; tieback soldier pile retaining walls with timber lagging; or steel reinforced panel systems. These older technologies have history and precedence on their side. However, these systems lack many of the benefits of newer, more sophisticated segmental retaining wall (SRW) solutions.

Benefits of SRWs in DOT applications

Why should DOTs give segmental retaining walls the green light? Rick Valentine, geotechnical engineer and former consultant to Highway Innovative Technology Evaluation Center (HITEC), believes that SRWs are well-suited to most DOT applications. "Based on the work I did for HITEC, I was able to see, firsthand, how well these systems hold up under evaluation," Valentine states. He cites the cost efficiency of the system, ease of installation and aesthetic appeal as solid reasons for moving forward with more SRWs in DOT jobs.

SRWs such as this one constructed using gravel backfill and pre-approved geosynthetic reinforcement can readily perform as load-bearing walls.

Mike Adams, geotechnical engineer and researcher for the Federal Highway Administration (FHWA), builds huge mechanically stabilized earth (MSE) walls in order to conduct his research. An admitted fan of SRWs, Adams appreciates their versatility. "They're great from a creative and a structural standpoint. I'm thoroughly convinced SRWs are appropriate for load-bearing applications such as bridge abutment walls," he notes. "Unfortunately, right now SRWs are underutilized in DOT applications."

Compared to the commercial and residential markets, segmental retaining wall projects in the DOT market are far less vulnerable to failure because of their typical requirements. Says Valentine, "DOT projects nearly always specify gravel backfill and pre-approved geosynthetic reinforcement installed by an approved contractor. Given these characteristics, SRWs will perform just fine as load-bearing walls."

Why some DOTs are still reluctant to give SRWs a go

Though many professionals such as Valentine and Adams believe SRWs are a suitable choice for DOTs, the majority of states are slow to switch. "Engineers who work with state and federal DOTs weigh heavily their responsibility to the public's safety," says Valentine. "They need to be confident the research is there to justify a different approach to how they've been doing things. It's just a matter of time."

Another reason DOTs haven't completely embraced this type of wall relates to existing retaining wall standards. Explains Valentine, "Guidelines by the American Association of State Highway and Transportation Officials (AASHTO), which are the prevailing standards for most DOTs, can be overly conservative when applied to SRWs. For example, the criteria for the connection strength between the SRW unit and geosynthetic reinforcement is extremely difficult to meet. We should see a rise in SRW use as the guidelines are modified to reflect recent research findings."

Progressive states set examples

While most states have taken a wait-and-see attitude, there are at least four states that have been proactive in applying SRW and geotextile technology to DOT projects. Says Valentine, "Washington, Texas, Colorado and South Carolina have taken a progressive stance with SRWs.

A guardrail anchored into the SRW along the Centennial Trail protects passersby from a steep embankment.

Some exciting projects are cropping up in these states, demonstrating the potential of SRWs for highway and public transportation use."

In Castle Rock, Colorado, the DOT recently built the state's first bridge abutment SRW. The Founder's Meadow Bridge is supported on a reinforced soil mass rather than steel or concrete piles. Says Adams, "Colorado felt secure in their research and development with SRWs to proceed with this type of project. More will surely follow."

SRWs in highway projects trail the use in DOT projects of a more recreational nature. For example, the Centennial Trail in Spokane, Washington paired Anchor Diamond® retaining wall blocks and geotextile to support attractive paths for biking, walking and skating. "The more familiar DOTs become with SRWs," asserts Valentine, "the more overall acceptance we can expect to see."