Geocomp

Technologies to manage risk for infrastructure

Project Brief

Geosynthetic Reinforced Soil - Integrated Bridge System (GRS-IBS)

Client:

Tencate

Colorado Department of Transportation

Federal Highway Administration

Location:

I-70 over Smith Road, Aurora, CO

Services or Products Provided:

- GeoDetect® Synthetic with fiber optic sensing
- Remotely positioned Micron Optics Interrogator with on-board computer
- Remote access through IP Phone communication

Value Provided:

- Help verify stress distribution through reinforced layers at various depths
- Confirm design assumptions and validate modeling
- Provide real-time data to show how system performance changes over time

Background & Project Challenges

Main cables to the fiber optic interrogator

A bridge replacement project on I-70 over Smith Road and the Union Pacific Railroad in Aurora, Colorado, will be the first in the country to use a Geosynthetic Reinforced Soil - Integrated Bridge System (GRS-IBS) for a multi-span bridge on an Interstate. Instead of conventional bridge support technology, GRS-IBS technology uses alternating layers of compacted granular fill material and fabric sheets of geotextile reinforcement to provide support for the bridge. GRS also provides a smooth transition from the bridge onto the roadway, and alleviates the "bump at the bridge" problem caused by uneven settlement between the bridge and approaching roadway. Colorado received a $2 million grant for the groundbreaking project.

Geocomp Role & Accomplishments

Through experience and training in fiber optics and as system integrator with Micron Optics (MOI), Geocomp has become TenCate's installer for their GeoDetect® fiber optic geosynthetic product line. In this application, thirteen strips of the GeoDetect® geosynthetic will be placed in multiple lifts during the construction of the GRS Bridge abutments to document stress distribution in layers down the depth of the abutment. The GeoDetect® sensors will be permanently wired to a remotely positioned MOI interrogator data collection unit for continuous monitoring of soil performance.

The technology offers unique advantages in the construction of small bridges, including:

- Reduced construction time and cost, with costs reduced 25 to 60 percent from conventional construction methods.
- Easy to build with common equipment and materials; easy to maintain because of fewer parts.
- Flexible design that's easily modified in the field due to unforeseen site conditions, including unfavorable weather conditions.