INNOVATIONS IN EROSION CONTROL, LANDSLIDE REMEDIATION AND DESIGN AND CONSTRUCTION OF RETAINING WALLS, BOX CULVERTS AND BRIDGES: ONE TECHNOLOGY; MULTIPLE APPLICATIONS[1]

Robert K. Barrett[2], Cameron A. Lobato, and Colby E. Barrett

Geosynthetically Confined Soil research and demonstrations over the last 40 years by the United States Department of Agriculture, Forest Service, (USFS), the Federal Highway Administration (FHWA), the Colorado Department of Transportation (CDOT), the University of Colorado/Denver (UC/D), the National Cooperative Highway Research Program (NCHRP) and a host of researchers and institutions around the world has resulted in more efficient, expedient and cost effective tools and methods to control landslides and erosion, and to build retaining walls, box culverts and bridges. It is a case of one basic technology that can be adapted to multiple uses.

Before about 1970, the choices for retaining walls were limited to cantilever and crib-type gravity systems. Researchers in France developed a novel and counterintuitive system whereby soils were modified with tensile inclusions. The result was the ability to build retaining walls with vertical faces where most of the forces and loads were accommodated by the backfill soil, and not the external containments as with traditional walls.

The first tensile inclusions were metallic. It has been demonstrated that geosynthetic sheets and grids can also serve as the tensile or confining element. The most recent research and demonstrations show that composites constructed with soil and geosynthetics have bearing capacities that lend to building abutments and piers. Soil Nailing and Micropile Foundations are also benefiting from new design approaches based on closer spacing with much smaller elements.

State of the Art has advanced well beyond Practice. The Poster will show a number of case histories of innovative applications of seismic-resistant soil nails, micropiles, retaining walls, bridges and more that can now be implemented to advantage in new construction and in maintenance of existing facilities.

---

[1]Poster paper presented at the 2008 National Meeting of the American Society of Mining and Reclamation, Richmond VA, New Opportunities to Apply Our Science**,** June 14-19, 2008. R.I. Barnhisel (Ed.) Published by ASMR, 3134 Montavesta Rd., Lexington, KY 40502.

[2] Robert K. Barrett, President, Soil Nail Launcher, Inc, 955 Malachite, Fruita, CO 81503, Cameron A. Lobato, P. E., President, Geosolutions International, LLC, 549 South Broadway, Grand Junction, CO 81503 and Colby E. Barrett, E.I.T, Vice President, SNL, Inc.