

## CE 890 Graduate Seminar

- SPEAKER:** Brandon Bortz, Ph.D. student (Advisor: Dr. Mustaque Hossain)
- TOPIC:** “Innovative Uses of Quarry Waste and Reclaimed Asphalt Pavement”
- DATE:** March 16, 2011
- TIME:** 4:00 p.m. (refreshments at 3:45 p.m.)
- PLACE:** 2144 Fiedler Hall

### ABSTRACT

In Kansas, due to processing of soft limestone in the quarries, a large amount of fines are produced. The problem has been exacerbated by the introduction of Superpave system for hot-mix asphalt (HMA) that tends to use coarser aggregates and materials with lower fine content. This has resulted in a large amount of quarry waste being available as a construction material. Again due to binder issues, the uses of reclaimed asphalt pavement (RAP) in Superpave HMA are limited. Geocellular confinement systems (geocells) are 3-dimensional honeycomb-like structures filled with an in-fill of some available materials that vastly improve shear strength of in-fill materials. The objective of this study was to test geocell-reinforced bases with RAP and quarry waste under a thin HMA layer under full-scale traffic loading. HMA pavement test sections with geocell-reinforced bases, with RAP and quarry waste as infill materials, were constructed at the Civil Infrastructure System Laboratory (CISL) of Kansas State University. The sections were paved with a 50-mm Superpave hot-mix asphalt HMA layer and instrumented to measure the stresses on top of the subgrade. The sections were loaded to 50,000 to 70,000 repetitions of an 80-kN single axle load. The calculated and measured responses show that on both test sections, stresses on top of the subgrade exceeded the unconfined compressive strength of the soil. It was concluded that the geocell depth and/or the thickness of the HMA layer need to be increased even for paved low-volume roads.