

# Effect of Geogrid Reinforcement on the Behavior of Granular Material under Cyclic and Monotonic Loading

Murad Abu-Farsakh<sup>1</sup>, Munir Nazzal<sup>2</sup>, and Louay Mohammad<sup>3</sup>

## ABSTRACT

This paper presents the results of monotonic and cyclic triaxial tests that were conducted on unreinforced and geogrid reinforced granular aggregate samples to evaluate the effects of stiffness, location, and number of geogrid layer(s) on the strength properties and cyclic deformability of these samples. Three different types of geogrids of different stiffness properties were used to reinforce the samples. For each geogrid type, three different cases were investigated by varying the location and number of geogrid layers. Statistical analyses were conducted on the triaxial test data. The results indicated that samples reinforced with stiffer geogrid exhibited greater improvement, and samples reinforced with two geogrid layers always had the maximum improvement. However, the minimum improvement was observed for samples reinforced with single geogrid layer placed at the middle. Moreover, the results demonstrated that geogrid reinforcement did not have a significant effect on the resilient behavior of the crushed limestone samples. Multi-source regression analyses were also conducted to develop models that can predict the improvement achieved due to geogrid reinforcement using the geogrid stiffness modulus as quantitative variable, and the geogrid arrangement as an indicator variable.

Keywords: reinforcement, monotonic, cyclic.

## Corresponding Author:

Murad Abu-Farsakh  
Louisiana Transportation Research Center  
4101 Gourrier Avenue  
Baton Rouge, LA 70808  
Phone: (225) 767-9147  
E-mail: mabuf@ltrc.lsu.edu

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<sup>1</sup> Research Assistant Professor, Louisiana Transportation Research Center, Louisiana State University, Baton Rouge, LA 70808.

<sup>2</sup> Graduate Research Assistant, Department of Civil and Environmental Engineering, Louisiana State University, Baton Rouge, LA 70808.

<sup>3</sup> Associate Professor, Department of Civil and Environmental Engineering, Louisiana Transportation Research Center, Louisiana State University, Baton Rouge, LA 70808.