Evaluation of Geogrid Reinforcement on Forest Service Roads

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This project examines the potential benefits of the use of triaxial geogrid on unpaved Forest Service Roads. The Forest Service is tasked to maintain forest roads throughout the US, but due to a lack of resources and increasing traffic volumes, it is a challenge to provide adequate road conditions. The potential for geogrid to reduce maintenance costs and initial construction costs, particularly in areas with weak and unstable subgrades and roadways, makes this an appealing investigation. The goal of the project is to test several different geogrid and aggregate thickness options for their suitability and performance under these conditions. The project involves the installation of several structural roadway sections to evaluate performance and cost. A geotechnical site investigation was carried out, with soil samples collected at several depths and locations along the roadway. Samples were taken directly in the roadway and backfilled. Structural section design was determined following initial geotechnical investigation and subgrade classification. A total of four structural sections (14ft wide) were installed in the 130-foot-long test area. Structural section 1 was comprised of one layer of geogrid and six inches of aggregate base course (ABC). Structural section 2 consisted of two layers of geogrid and 12 inches of ABC. Structural section 3 consisted of one layer of geogrid and 12 inches of ABC. The final section was 12 inches of ABC with no geogrid reinforcement as a control section. The roadway was tested using a dynamic cone penetrometer before and after the installation of the structural roadway sections. Plate load tests were conducted on the installed sections to measure deformations. Field observations have been scheduled in a bi-monthly basis to visually confirm and verify the condition of the roadway. It is believed that geogrid reinforcement improves the capacity of the roadway surface, with significantly reduced rutting and damage from roadway traffic. The research team will keep monitoring the condition of geogrid sections for the next two years to assess the effectiveness of geogrid reinforcement. While this project is ongoing, it is expected that the project will provide local Forest Service engineers with design guidelines for installing geogrid materials and maintaining unpaved reinforced roads within its jurisdiction.

Key words: geogrids, forest service roads, geogrid reinforcement, unpaved roads