



Florida Department of Transportation Research

Surface Pavement Solutions for Poor Subgrade Conditions, Phase II: Performance Analysis of Test Sections and Implementation Guidelines BD546-07

Several areas within FDOT Districts 4 and 6 contain thick layers of organic soils at relatively shallow depths. Roads built on these soft compressible soils often develop premature cracking, distortion, and settlement. Traditional repair methods, such as complete reconstruction, removal of unsuitable material and replacement with select material, often are impractical due to the thickness of the soil layer and the length of time associated with construction.

Researchers at the Department of Civil, Environmental and Geomatics Engineering, Florida Atlantic University, recently studied strategies to rehabilitate pavement constructed on compressible soils. They selected 24, 500-foot-long experimental pavement test sections on State Road 15/U.S. 98 in Northwest Palm Beach County. Four types of pavement reinforcing products were applied separately as an overlay to 16 sections; eight control sections included no reinforcing materials. The reinforcing products included a high-stiffness open mesh glass fiber reinforced polymeric grid, a composite of non-woven paving fabric and glass fiber, a double-twist woven hexagonal steel wire netting, and an asphalt rubber binder covered with aggregate called Asphalt Rubber Membrane Interlayer (ARMI).

Researchers conducted non-destructive field tests at 6-, 12-, and 18-month intervals, including falling weight deflectometer (FWD), ride quality, and rut and crack surveys, to assess condition and stiffness of the overlay sections. They developed a statistical data analysis protocol and a color-coded graphical representation method to determine performance similarities for each section and rank the various products.

Researchers found that reinforcing products could be applied successfully over the rutted



Foreground: A straight edge placed on the pavement measures the rut depth along State Road 15/U.S. 98 in Palm Beach County. Background: A falling weight deflectometer (FWD), mounted to a tow vehicle, evaluates the physical properties of pavement.

pavement. Researchers compared the six-month FWD test results with preconstruction results and found that the mesh, fiber, and wire netting products improved pavement stiffness in 11 of the 12 test sections, while the roadway stiffness resulting from the application of the ARMI product remained unchanged. Researchers observed similar trends with the 18-month data. They also observed measurable and statistically significant differences between the reinforced sections compared to the unreinforced control sections.

Researchers concluded that, considering the complexity of the pavement system, especially in thick organic subgrade and several layers of overlay placed on roadways, no reasonable estimate of effectiveness could be predicted with the short-term data collected during the study. Researchers recommend the continued evaluation and analysis of test sections to establish an effective ranking of the reinforcement products and to determine the life cycle of each test section, and to develop associated design and construction guidelines for use with organic soils.