Use of Geosynthetics in Airport Pavements

Jeffrey S Gagnon,[1] P.E.
[1] FAA Airport Technology R&D Branch, William J. Hughes Technical Center, Atlantic City Int'l Airport, NJ 08405, jeffrey.gagnon@faa.gov

The Federal Aviation Administration (FAA) issued Advisory Circular (AC) 150/5370-10H – Standard for Specifying Construction of Airports, in December 2018, which includes language regarding the use of geosynthetics (i.e. geotextiles and geogrids) in airfield pavements. In support of the official release, the FAA's Airport Pavement R&D Section is conducting research to determine potential structural and performance improvements that these geosynthetic products provide within an airport pavement structure under aircraft loading conditions.

In 2019 Construction Cycle 9, an asphalt pavement test section, was completed at the National Airport Pavement Test Facility (NAPTF) in Atlantic City, New Jersey. Of the ten (10) test sections, two test sections incorporated geotextile and geogrids for use as a separation layer and reinforcement layer. The first pavement structure, identified as LFC-3S (Figure 1), consists of a high plasticity silty clay subgrade with an average CBR value of 5.0, 74 cm (29.0") of P-154 granular subbase, 20 cm (8.0") of P-209 crushed aggregate base course, and 13 cm (5.0") of P-401 asphalt mix surface course with an AASHTO M-288 class 2 geotextile separation fabric placed at the subgrade/subbase interface. The second pavement structure is a two-layer geosynthetics application (Figure 1), identified as LFC-3N, consists of a high plasticity silty clay clay subgrade with an average CBR vale of 5.0, 74 cm (29.0") of P-154 granular subbase, 20 cm (8.0") of P-209 crushed aggregate base course, and 13 cm (5.0") of P-401 asphalt mix surface course. The two-layer geosynthetics will consist of an AASHTO M-288 class 2 geotextile separation fabric placed at the subgrade/subbase interface and a reinforcement Geogrid placed at the subbase/base course interface(Figure 2). The performance of the two sections will be compared to the performance of the control section (Shown in Figure 1), identified as LFC-4S, an identical pavement structure without geosynthetics applicaitons.

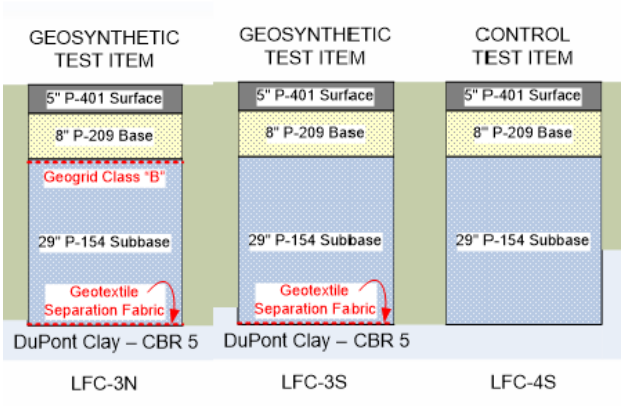

Figure 1: Pavement Cross Sections

Figure 2 Installation of Geogrid

Full-scale accelerated pavement testing under simulated Boeing 777 loading conditions (shown in Figure 3) is currently underway. The loading will follow the typical wander pattern used at the NAPTF (Figure 3).

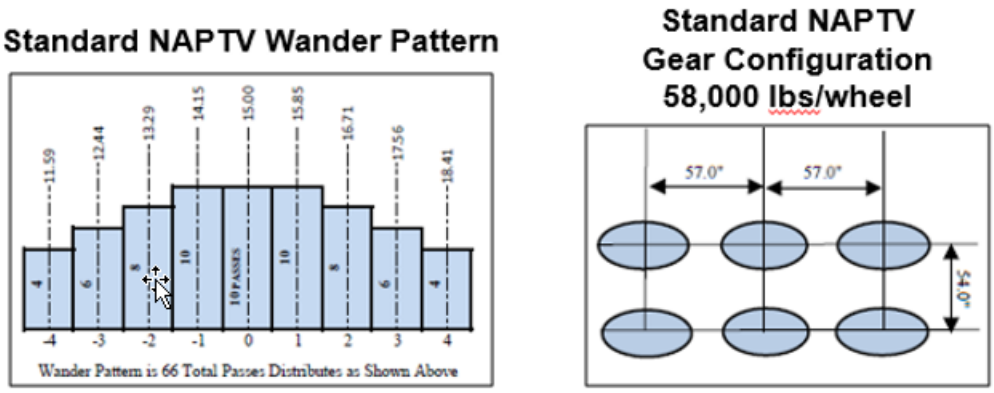

Figure 3: Wanger Pattern and Gear Configuration

This presentation will discuss the FAA's geosynthetics research program and preliminary findings from the accelerated pavement testing. Pavement performance will be evaluated on rutting performance, fatigue life performance based on crack density, and non-destructive testing evaluation. This full-scale accelerated pavement testing will provide critical data points to further evaluate structural benefit, realized from incorporating geosynthetics in airport pavements.