"Application of Geotextiles in Airport Paving''

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Abstract

Application of Geotextiles

Geotextile play several important roles in hazardous or sanitary landfills, roads and airport paving, earth embankments, dams, coastline slope protection, streambed lining, sand and dune protection, foundation reinforcement, temporary walls, pipelines, erosion control structures, clay liners, reservoirs and tanks. Airport paving is considered one of the most important applications of geotextiles. Where geotextiles are placed between base course and sub-base course. Because geotextiles are high tensile strength materials, and soil, in general are low tensile strength (but high compression strength) materials. Therefore geotextiles are ideal materials to increase soil quality and thus to increase soil structural stability, also geotextiles increase load –bearing capacity by providing tensile mechanism to the soil.

Airport paving

Airport pavements are designed to provide adequate support for the loads imposed by aircraft using that uses the airport. Airport paving must stability, durability and smoothness all year, all weather surfaces should be free from dust or particles and distribute. The pavement must be of adequate thickness and have sufficient stability.

The pavement structure consists of one or more layers of processed materials. Paving is divided, into two general types flexible and rigid.

Flexible paving

This type consists a bituminous surface course, a base course of a suitable material, and usually a granular sub-base course. The design of flexible pavement is based on the results of sub-grade soil tests.

A flexible pavement consist of the following layers

1-surface course 2-base course 3-sub-base course .

Rigid paving

This type is made of Portland cement concrete, usually placed on a suitable sub- base course, which rests on a compacted sub grade

The experimental work

Two kinds of textile materials were used in this research, polyester and polypropylene fibers. Non woven construction was used for producing all samples, it depended on using cross- laid web with needle bonding and weave bonding processes for web bonding.

Through this research, it was reached to the following results

1- It can be seen from the results that the more number of beats/min and puncture depth, the higher tensile strength and puncture strength the samples become. I can report that the increase in these factors increase friction areas which increase the consistence between the fibers by needle stress which increase the cutoff durability

2- It is obvious from the statistical analysis of the tensile strength and puncture strength

results that there are direct relationship between fibers count, weight per m2 and tensile strength and puncture strength .I can state that the increase fibers in unit area, as well as cohesion spaces between fibers cause cutoff resistance

3-It is also clear that from the tables that samples used weave bonding had recorded the highest rates of tensile strength and puncture strength, whereas samples used needle bonding have recorded the lowest rates. I can report that samples used weave bonding are considered a composite fabrics which have high durability.

4-It is also clear that from tables that an inverse relationship between fibers count, number of beats /min and puncture depth and the decrease ratio in fabric thickness, I can report that the increase in these factors cause the fabric to be more compacted which cause the decreasing in the fabric thickness under load.

5-It is also obvious from diagrams that samples used the needle bonding have recorded the highest rates of compressibility under load, whereas samples used the weave bonding have the lowest rates .I can state that samples used weave bonding are composed fabric which cause decrease compressibility under load

6-It is also obvious from the statistical analysis that tensile strength in machine direction is higher than the tensile strength in cross machine direction. This is due to that carding machine make fibers straight in machine direction which cause an increase in the friction between fibers.

7-It can be seen from tables that the more number of beats/min and puncture depth, the lower elongation the samples become. I can report that the increase in these factors increase friction areas which increase the consistence between the fibers by needle stress to which cause decrease the elongation .