

Geotextiles: A Multipurpose Tool and Its Importance in Agriculture

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Abstract

Technical textiles are the products manufactured using natural as well man-made fibres which are used for their technical performance and functionality in an array of sectors such as agriculture, construction, sports apparel and health care etc. Geotextiles are one of the segment of technical textiles which are manufactured as fibres made of synthetic polymers (such as PP, PE, PET and PVC) and are in notably large demand because of their cost effective polymer production and remarkable properties (mainly tensile strength , durability and hydrophobicity). Geotextiles can be used individually as geomembrane, geocell, geonet or in combination as geocomposites with others in order to enhance their action or to obtain a multitask layer for specific end use functions. Geotextiles made of synthetic fibres are scrutinized as a modern achievement and have grown into needful auxiliaries for infrastructure, soil, construction, agriculture and environmental applications..

Keywords: Agriculture, Geotextiles, Technical textiles

Introduction

As we look around, textiles are major part of our lives ,we wear them for clothing, we use them to decorate our houses , for construction of different infrastructures but there are more uses to textile than those meet our eyes. Coming to the use of textiles other than decorative and aesthetic purposes, technical textiles are the textiles used for their technical performance and functionality in an array of sectors such as agriculture, construction, sports apparel and health care etc. Geotextiles made of synthetic polymers (such as PP, PE, PET and PVC) are a part of technical textiles which are scrutinized as a modern achievement and have grown into needful auxiliaries for infrastructure, agriculture and environmental applications.

Geotextiles

Geotextiles are a manmade product which possess different functions. Geotextiles act as a separator when placed between dissimilar materials which if mixed under pressure would weaken the structure. They provide reinforcement by adding tensile strength to earth material and improving stability. Geotextiles are used extensively as filters which retain soil while allowing water or other fluids to seep through. They may also function as drains by providing a flow channel for transportation of water within the plane of the fabric. Several studies have demonstrated the contribution of different geotextiles and their specific functions for controlling soil erosion for slopes and riverbank stabilization and for other applications where revegetation is highly desirable.

Properties of geotextiles

Properties of geotextile contribute to the use of textiles for the appropriate function. Mechanical properties such as tensile strength, bursting strength, elasticity and abrasion resistance which relate to strength are important for knowing how much load the fabric can take before it fails when used with heavy equipment. Endurance properties relate to the life of the structure resistance to UV light which degrades the fabric such as temperature stability abrasion and fatigue resistance. Hydraulic properties relate to movement of fluids for the functions of filtration and drainage and must allow water to pass through and along the plane of the fabric. Fabrics designed for geotextile uses are highly permeable and thinner geotextiles have greater filtration rates than thicker geotextiles. For adequate initial flow of fluids through the textiles and resistance to soil clogging over time. The permittivity, volume rate of flow across the fabric per unit area per unit gradient and the apparent opening size of the geotextile are important for fluid movement.

Types of geotextile

Different types of geotextiles are used for performing specific functions such as geomembranes are impervious sheets of rubber or plastics used as a moisture or vapor barrier, geogrids are grid like polymeric materials used in soil stabilization due to high tensile strength, geonets are a 3-dimensional matrix of polymer strands utilized for in-plane drainage, geocomposites are usually composed of two geosynthetics for specific application like drainage, erosion control and bank embankment etc, geocell is made of strips of polymer sheet or geotextile connected at staggered points.

Importance of geotextiles in agriculture

As we know agriculture industry plays a significant part in the Indian economy, accounting for around 20% of Gross Domestic product (GDP). Around 62 percent of India's population is reliant on it for survival. In the current scenario due to rapid urbanization and modern agricultural activities has lead to problems such as land degradation, pest outbreaks and low production, so there is a need to opt for sustainable solutions. Since the geotextiles possess the characteristics of light weight, water absorption, light penetration, and ventilation, they provide different functions and applications for agricultural industry development, which include geotextile as fence for protection against wind, animals , geotextile as ground cover fabric for erosion control, geotextile in livestock applications for bedding and feeding surfaces, geotextiles for manure storage , geotextile bags for fruit protection against pests and diseases etc.

Conclusion

Geotextiles are a manufactured product whose development and related applications will be helpful in replacing conventional agricultural processes of erosion control, pest protection and waste removal while paying more attention to the environmental and ecosystem conservation and are also economical in terms of cost. However, research is still required for determining the use of highly specialised geotextiles with complex formulations in agriculture and for incorporating the use of these geotextiles in agriculture

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