TECHNICAL TEXTILES – PART VI

REF: TT/ DEC 2021/ WK 3

GeoTech or Geotextile materials

Geotextiles are mainly made from polypropylene and polyester. Fibers for geotextiles are normally produced by melt-spinning. High Density Polyethylene (HDPE) is applied to receive reinforcement requirement. Staple fibers, monofilaments, multifilament yarns and slit films are also applied. Beside this polyethylene, polyamide, polyvinylidene chloride, and fiber glass are also used.

Based on manufacturing process, geotextiles can be divided into woven, nonwoven and knitted.

a) Woven geotextiles - Woven fabrics are made by the regular weaving method. This type has the characteristic appearance of two sets of parallel threads or yarns. The yarn running along the length is called warp and the one perpendicular is called weft, producing mesh material of different sizes and opening according to the tightness of weave. A woven fabric gives high tensile strength, high modulus, and low strains, but gives poor abrasion resistance and dimensional stability. Geotextiles made from polyolefin, are light in weight and strong but cheap. These permeable woven geotextiles are generally used for filtration and impermeable membranes to hold out mud pumping. Certain fabrics provide high puncture resistance and offer a significant recognition in road and rail construction projects, or where the reliability of the sheet is required, as in landfill sites.

b) Non-Woven geotextiles – Non-woven geotextiles are manufactured from either continuous filament yarn or short staple fiber. The bonding of fibers is done using thermal, chemical or mechanical techniques or a combination of techniques. Non-woven fabrics have high permeability and high strain characteristics. They are produced in a number of geometric and polymeric compositions for different applications. Many geotextiles are made by polypropylene. Fabric produced concrete revetment mats; silt filter fences, erosion control blankets, and fabric envelopes for pipe under drains are the examples of geotextile applications. Non-woven geotextiles are available in the form of polypropylene fibers and are needle punched. Nonwoven fabrics have the ability to resist damage, superior permeability and frictional resistance; however their tensile strength is lower than that of woven fabrics.

c) Knitted geotextiles – Knitted geotextiles are manufactured by the process of interlocking a series of loops of yarn together. All knitted geosynthetics are formed by using the knitting technique in conjunction with some other method of geosynthetics manufacture, such as weaving. Knitted textiles

have fewer applications in geotextiles. However, warp-knitting technology is used to make geotextiles to provide reinforcement with easy sensor.

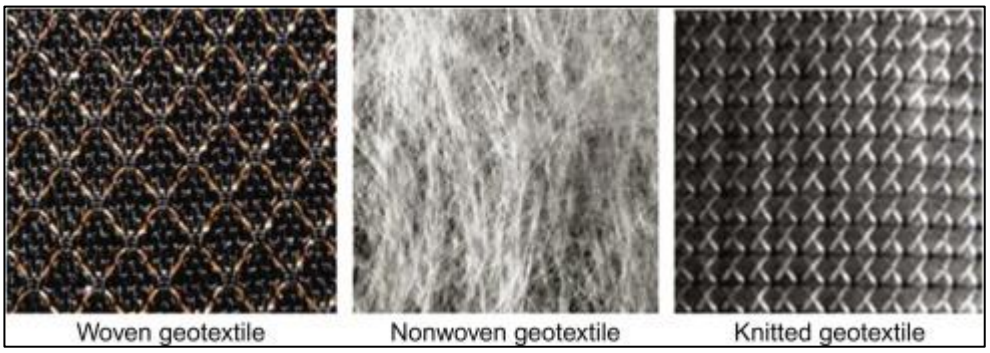

Fig 1.1 Types of geotextile

Ref: sciencedirect.com

Geotextiles from the natural fibers

a) Jute - Jute geotextiles can perform a vital function in the control of soil erosion by revegetation. It has many benefits as geotextiles, because of its high water absorption capability, flexibility and drapability. It also mixed with other materials, such as in the construction of 'jute-sand-mat' structures. The growth of jute based geotextiles is huge due to its various applications in infrastructure development.

b) Flax/Coir - Coir is a natural insulation material produced from flax fibers, intertwined together into non-woven matting, which can then be put into wall cavities. Coir geotextiles are applied in areas of erosion control, soil conservation, and other civil and bioengineering applications. It also has the appropriate strength and toughness to protect the slopes from erosion while permitting vegetation to flourish. They can dissolve the energy of flowing water and absorb the extra solar radiation.

c) Coconut Matting - It is used to address the problems of soil erosion and land sliding on manmade slopes such as motorway and railway embankments.

References:

1. https://atira.in/
2. http://technotex.gov.in/
3. https://www.fibre2fashion.com/
4. http://www.ittaindia.org/

.....To be continued.....

UNSCRAMBLE THE JUMBLE WORDS
HGTTIENSS
STEKNALB
SESNHGUOT
NAMMEAD

Last week`s Answers: 1) EVOLUTION 2) PLANTING 3) DEMOLITION 4) CONCRETE

Wishing you a great week ahead!

Technical Tuesdays is a knowledge sharing initiative by Resil Chemicals Private Limited

arc@resil.com | www.resil.com.