Fundamental of Reinforced Soil

Reinforced earth

- Reinforced earth is a combination of earth and linear reinforcing strips that are capable of bearing large tensile stresses.
- Wire mesh/geotextile fabric construction materials are light, easy to transport, and quick to construct.
- The only machinery required is a backhoe/excavator and a compactor.
- Differential settlement is eliminated & Bearing Capacity increased.
- Rapid construction is reported.
- This technique can result in saving the area of land.

Geosynthetic

- Planar product manufactured from polymeric material used with soil, rock, earth, or other geotechnical engineering related material as an integral part of a man-made project, structure, or system.

Geosynthetics are classified as follows

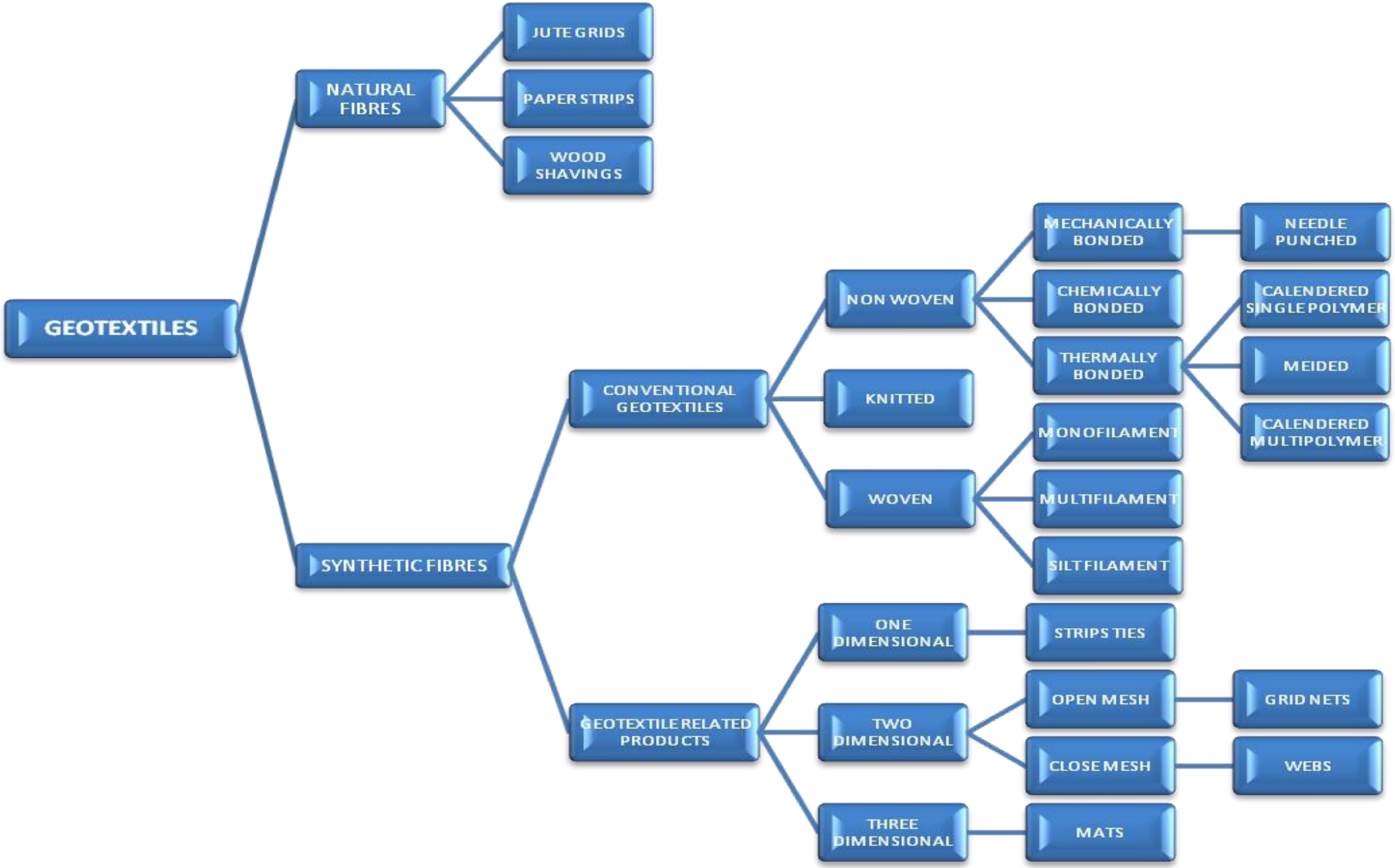
1. Geotextiles
2. Geogrids
3. Geonets
4. Geomembranes
5. Geosynthetic clay liners
6. Geocells/geo web members
7. Geofoam
8. Geocomposites

Geotextiles

- Geotextiles are defined as any permeable textile used with foundation soil, rock, earth, or any other geotechnical engineering-related material as an integral part of a human-made project, structure, or system.

CHARACTERISTICS:

- Porous and allow flow of water through it.
- Most used geosynthetics.
- They may be either woven or non woven
- Available in rolls of 5.6m wide and 50-150m long.
- Composed of polymers like polypropylene, high density polyethylene, polyster.
- Function: Separation, Reinforcement, Filtration, Drainage.


GEOTEXTILES
NATURAL FIBRES
JUTE GRIDS
PAPER STRIPS
WOOD SHAVINGS
SYNTHETIC FIBRES
CONVENTIONAL GEOTEXTILES
NON WOVEN
MECHANICALLY BONDED
NEEDLE PUNCHED
CHEMICALLY BONDED
THERMALLY BONDED
CALENDERED SINGLE POLYMER
MEIDED
CALENDERED MULTIPOLYMER
KNITTED
WOVEN
MONOFILAMENT
MULTIFILAMENT
SILT FILAMENT
GEOTEXTILE RELATED PRODUCTS
ONE DIMENSIONAL
STRIPS TIES
TWO DIMENSIONAL
OPEN MESH
GRID NETS
CLOSE MESH
WEBS
THREE DIMENSIONAL
MATS

GEOGRIDS

- They have open grid like configuration i.e. they have large aperture between individual ribs.
- They have Low strain and stretch about 2% under load.
- Strength is more that other common geotextiles.
- Function: Used exclusively for reinforcement

GEONETS

- Formed by continuous extrusion of parallelsets of polymeric ribs(LDPE & HDPE) at preset angles to one another.
- Their design function is completely within the in-plane drainage area where they are used to convey all types of liquids.
- Though they are used for the drainage function but they have high tensile strength.
- Generally used along with one or two geotextile matter one at the top and other at the bottom to prevent soil intrusion .

GEOMEMBRANES

- Materials are relatively thin impervious sheets .
- Generally made from butyl rubber.
- The sell of geomembrane are greater than geotextiles.

GEOSYNTHETIC CLAY LINERS

- This is the juxta position of polymeric materials and natural soil.
- Factroy fabricated and betonite clay is sandwitched between 2 geotextile.
- Structural integrety is obtained by needle punching.
- Function: Containment,As Hydraulic barrier.

GEO CELLS

- Similar to geotextiles or geogrids but have depth.
- Formed by High Density Polyethylene sheets.
- When opened form honey comb like structure and that contain soil,gravel.
- Allow water through it.
- USE: In slopes with soft sub-grade erosion control in channels

GEO FOAM

• Large but but extreamly light materials with gas filled cells.

•Made from expanded poly styrene and extruded poly styrene by polymeric expansion process.

•Function: separation, lightweight fill, compressible inclusions, thermal insulation,

GEOCOMPOSITES

The various types of Geocomposites are :-

- Geotextile-Geonet Composites
- Geotextile –Geomembrane Composiets
- Geotextile –Geogrid Composiets
- Geomembrane –Geogrid Composite
- Geotextile-Polymer Core Composite

FUNCTION OF GEOSYNTHETIC MATERIALS

Type of Geosynthetic (GS)	Separation	Reinforcement	Filtration	Drainage	Containment
Geotextile (GT)	X	X	X	X	
Geogrid (GG)		X			
Geonet (GN)				X	
Geomembrane (GM)					X
Geosynthetic Clay Liner (GCL)					X
Geopipe (GP)				X	
Geofoam (GF)	X				
Geocells (GL)		X		X	
Drainage cell (DC)		X	X	X	
Geocomposite (GC)	X	X	X	X	X