

Perbaikan Tanah dengan Geosintetik

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Referensi

Robert M.Koerner (2005) *Designing with Geosynthetics*
5th ed., Pearson Education/Prentice Hall.

Hand outs

Definisi

Geosynthetics are planar products manufactured from polymeric material used with soil, rock or other geotechnical engineering-related material as an integral part of a man-made project, structure or system (ASTM D4439, 1995).

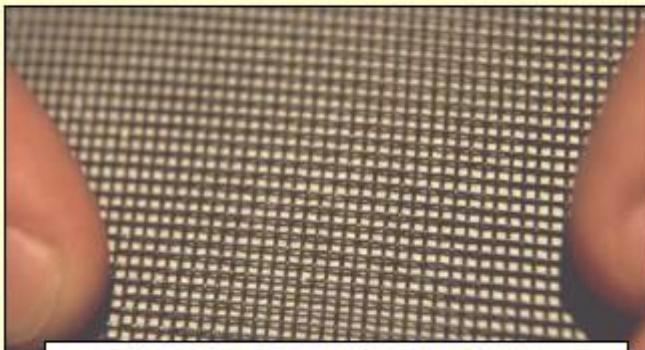
You can find a wide range of geosynthetic products such as:

Geotextiles

GEOTEXTILES



WOVEN GEOTEXTILE



Used as filters or for soil reinforcement

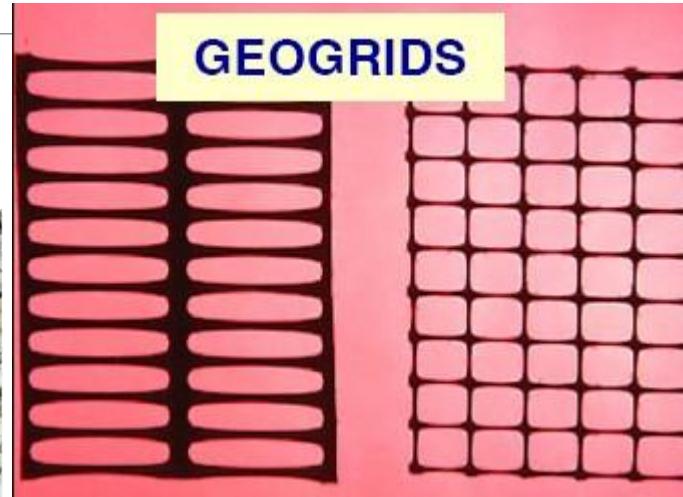
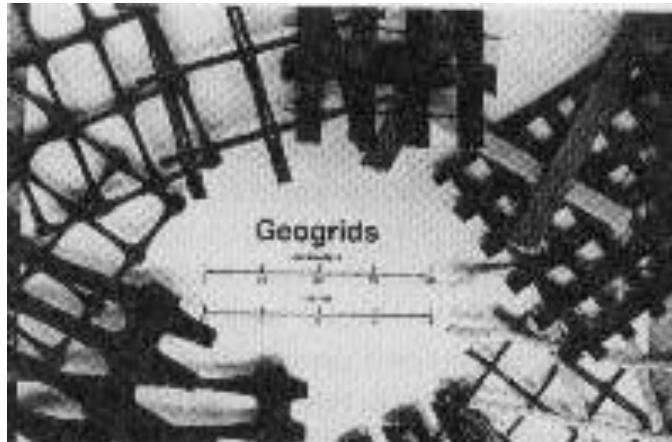


MICROPHOTOGRAPH OF NONWOVEN GEOTEXTILE



Used in numerous applications, e.g. filters or cushions for geomembrane protection

Geogrids



PLACEMENT OF GEOGRIDS



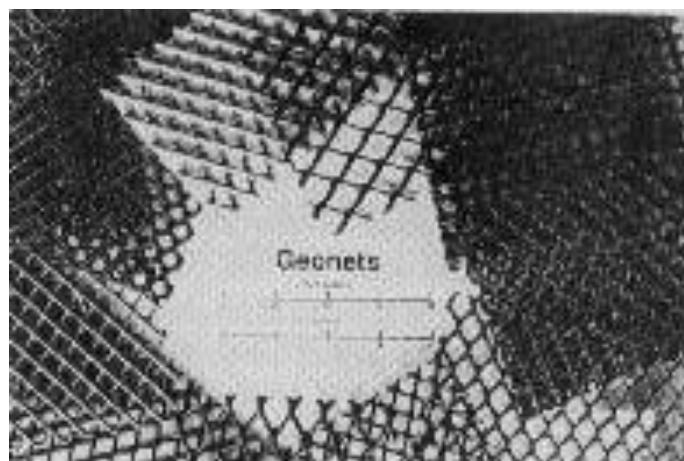
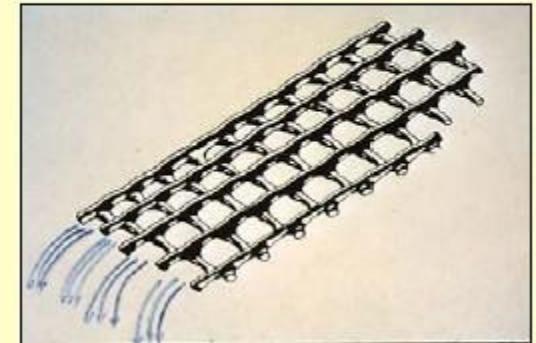
ROLLS OF GEOGRIDS



Geonets



Geonets can convey liquid and gas within their channels.

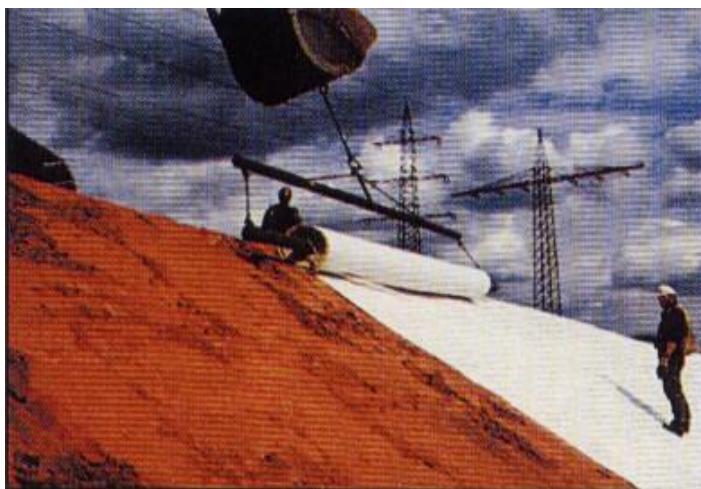


Geomembranes

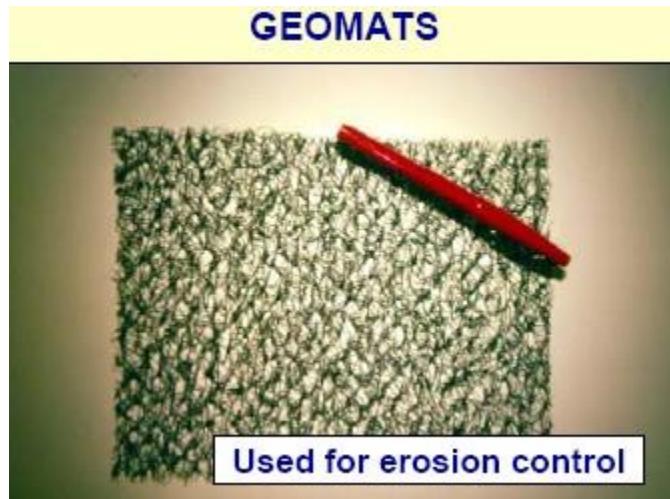
Geomembranes



Geosynthetics Clay Liners



Geomats and Geocell

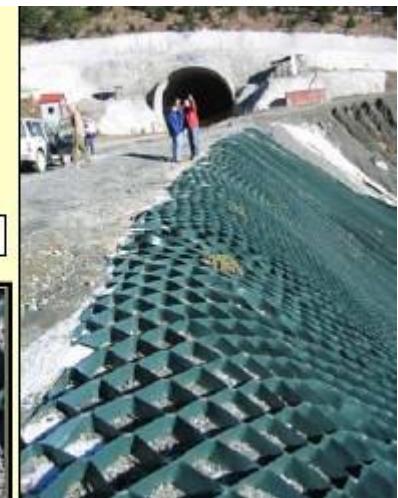
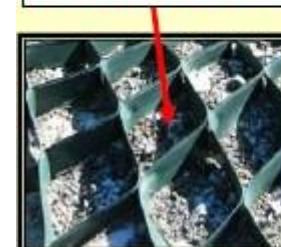


Geomat rolls used for erosion control

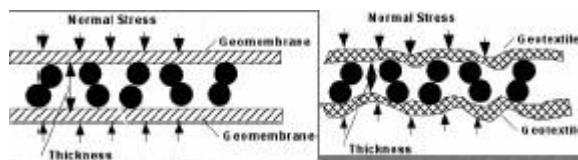
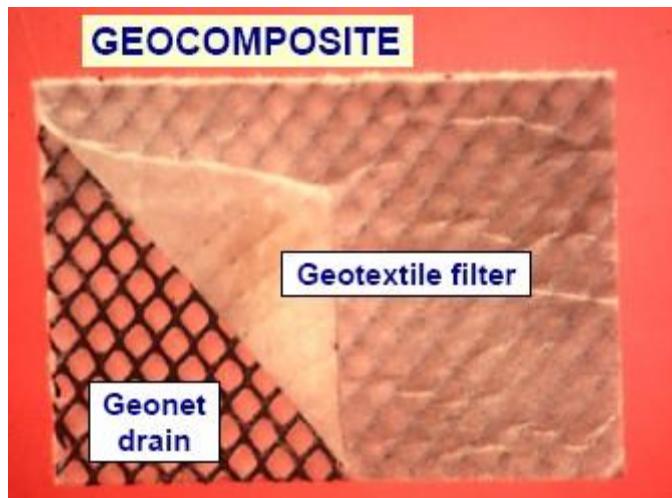


**EROSION
CONTROL
WITH
GEOCELLS**

To be filled with soil



Geocomposite



Manfaat Penggunaan Geosintetik

To perform better (e.g. with no deterioration of material or excessive leakage)

To be more economical than using traditional materials and solutions (either low initial cost or through greater durability and longer life; thus reducing maintenance & replacement cost)

Fungsi Geosintetik

Pemisah (*Separation*), dengan pemakaian geotekstil maka dapat memisahkan antara tanah timbunan dan tanah dasar di bawahnya.

Drainase (*Drainage*), mengalirkan air dari dalam tanah ataupun di permukaan tanah

Penyaring (*Filtration*), Terkait dengan fungsi filtrasi, maka geotekstil berfungsi sebagai filter mencegah masuknya air dan butiran halus dari tanah dasar ke dalam lapisan dasar timbunan

Perkuatan (*Reinforcement*), Maksudnya adalah geotekstil sebagai tulangan bagi tanah dasar untuk menyerap beban sementara yang diakibatkan oleh beban kendaraan.

Fungsi Geosintetik

Beneath highway **embankment**: separation and reinforcement

Beneath railroad ballast: separation, reinforcement, filtration and drainage

In flexible-forming systems to contain concrete, grout or soil: separation, reinforcement, and filtration

For prevention of crack reflection in asphalt pavement overlays: reinforcement and waterproofing

For landfill: containment (rare)

Sebagai pemisah / Separator

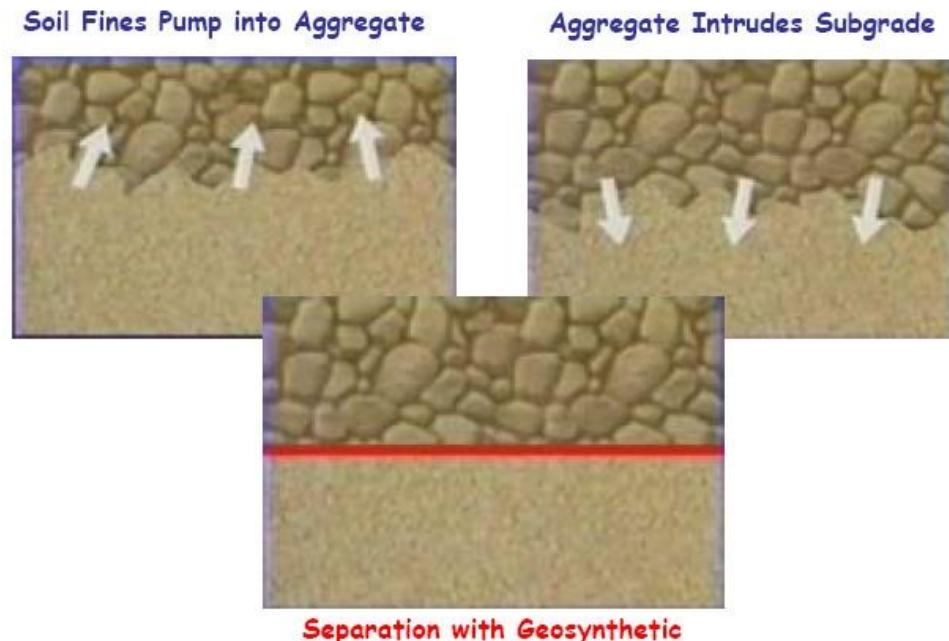


TIMBUNAN JALAN



Sebagai Pemisah (Separator)

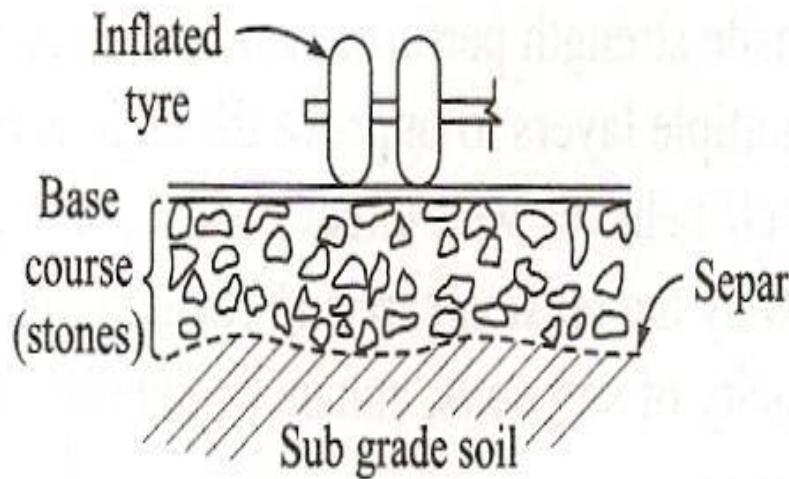
- *geotextiles* are used to prevent road base materials from penetrating into soft underlying soft subgrade, thus maintaining design thickness and roadway integrity
- *geotextile* separators also prevent fine-grained subgrade soils from being pumped into permeable, granular road bases



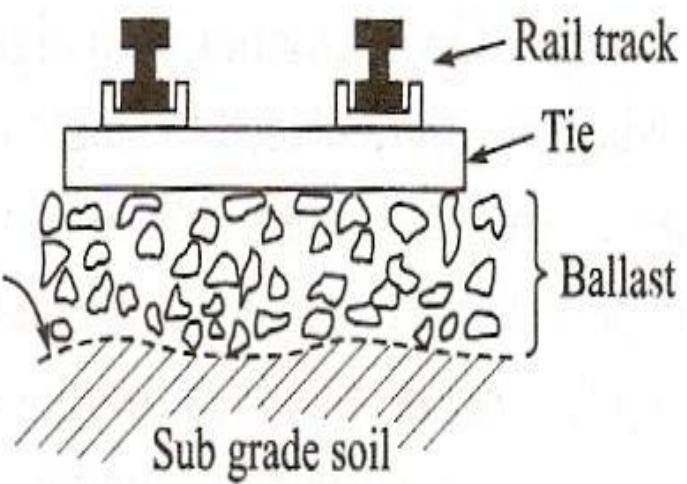
Application of geotextile as separator:

Road (below and above embankment), Railway, parking areas

Sebagai Pemisah (Separator)



(a) Beneath road



(b) Beneath rail track

Geosynthetics as separators

Sebagai Perkuatan (Reinforcement)

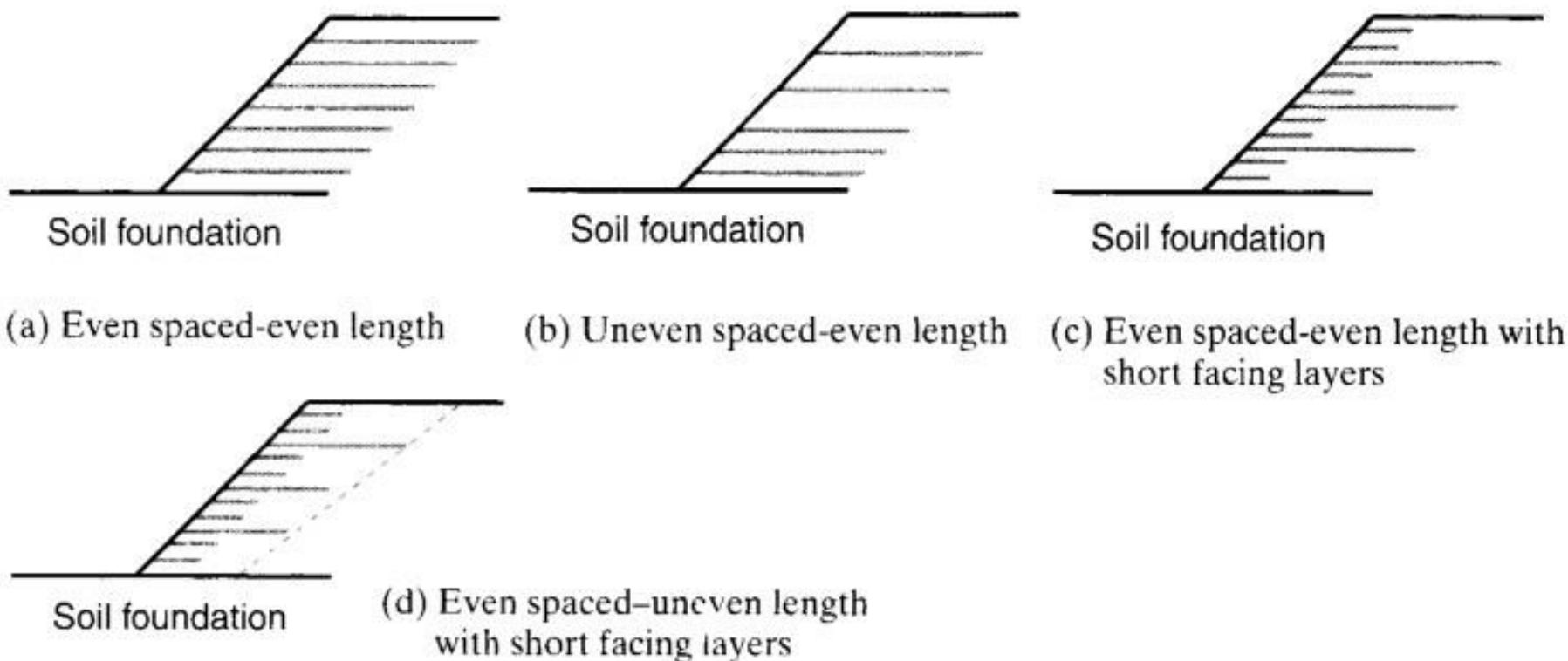
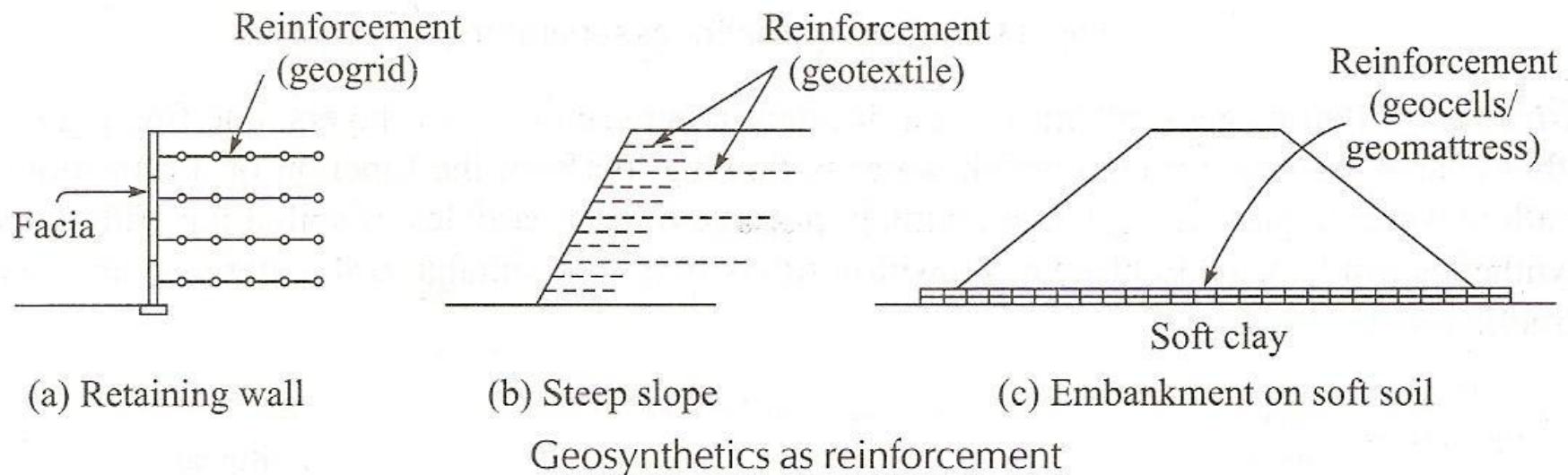


Figure 2.49 Various geotextile deployment schemes for stabilizing steep soil embankments on firm foundations.

Sebagai Perkuatan (Reinforcement)



Sebagai Filtrasi

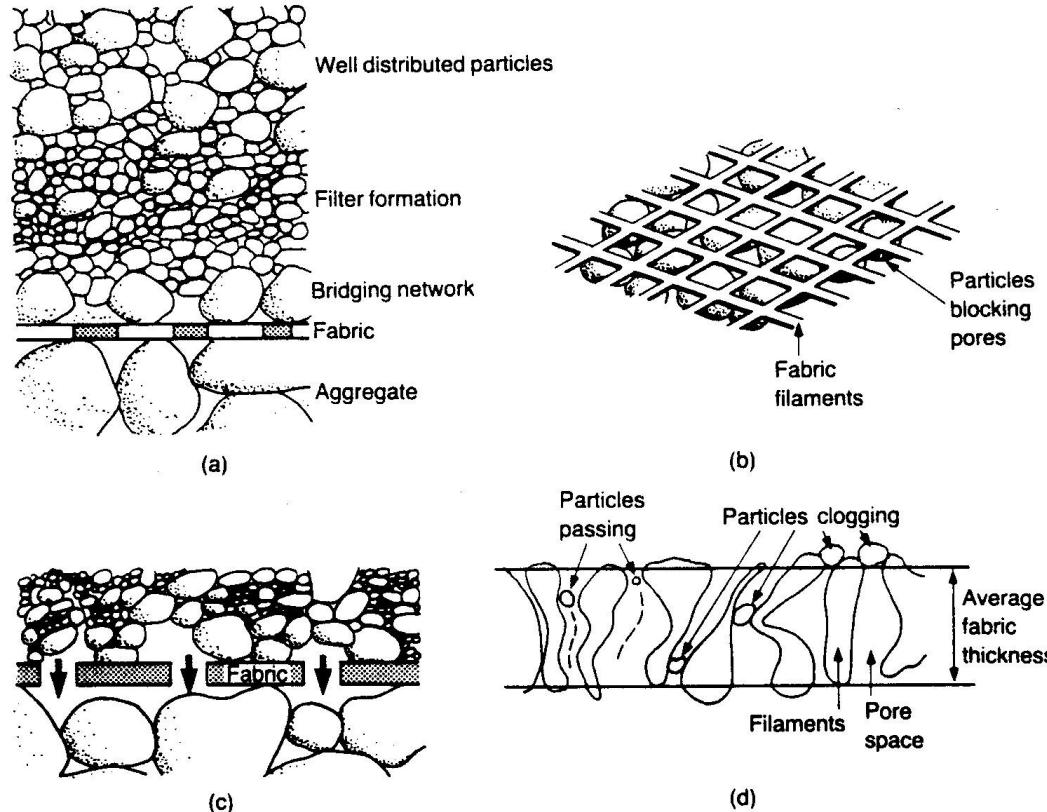
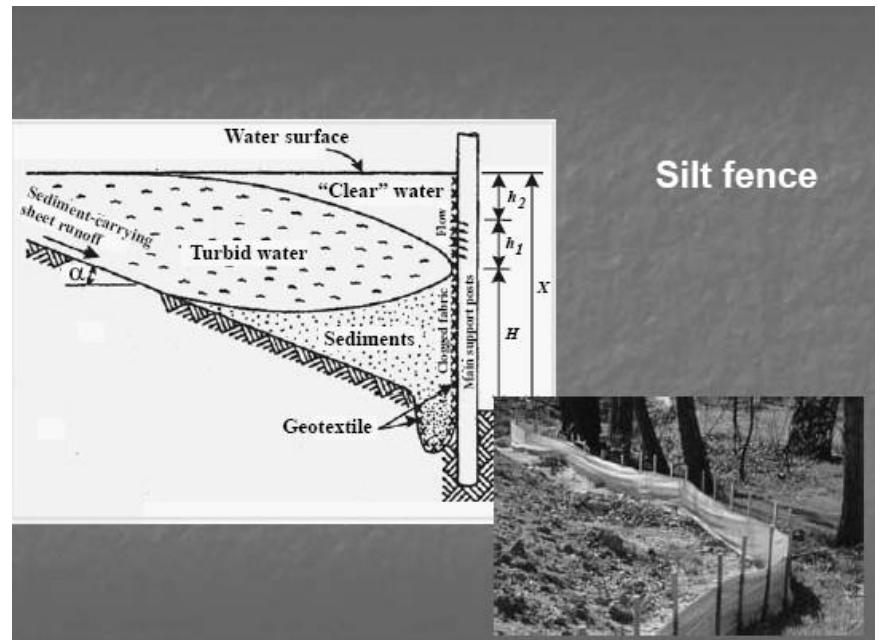
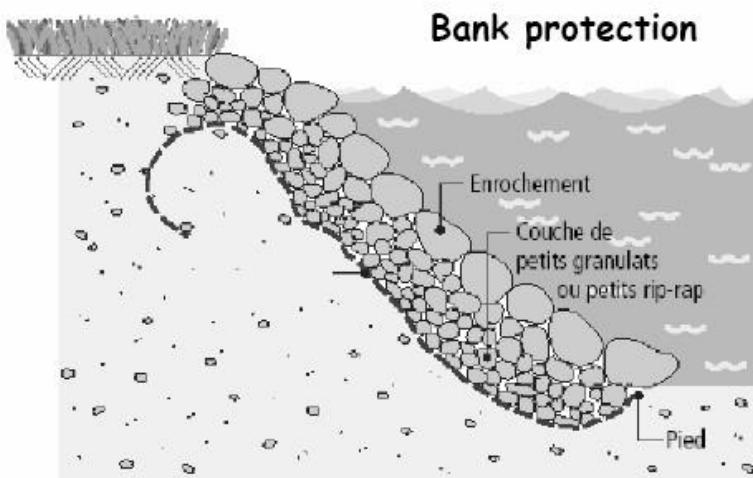
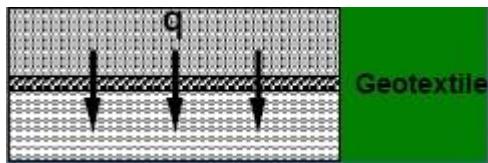


Figure VI.6 Various hypothetical mechanisms in soil geotextile compatibility

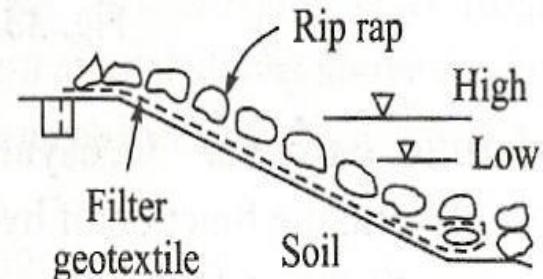
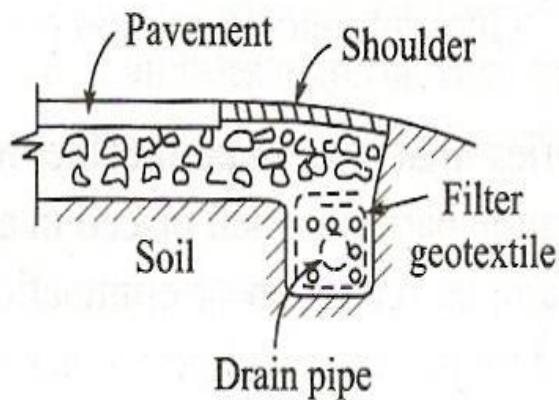
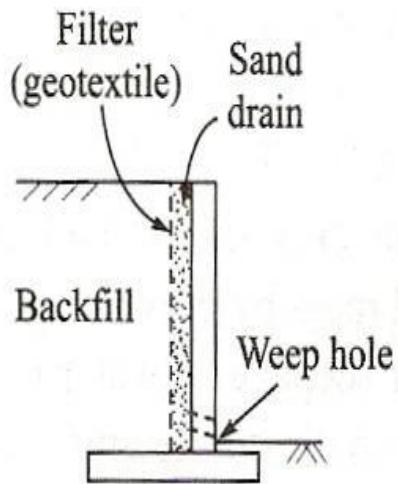
- (a) Formation of upstream soil filter
- (b) Upstream particles blocking openings
- (c) Upstream particles arching over openings
- (d) Particles clogged within geotextile structure

Aplikasi sebagai Filtrasi



Pelindung sungai dan pantai

Sebagai Filtrasi



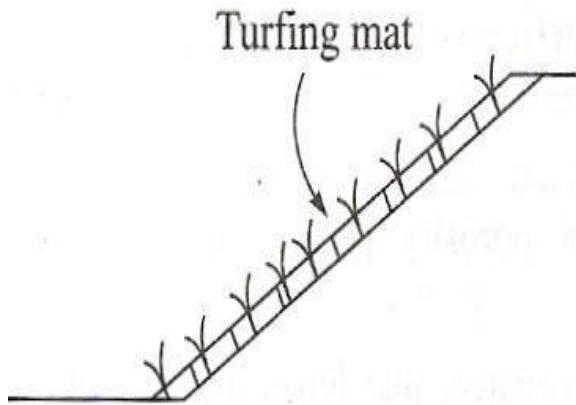
(a) Behind retaining wall

(b) Edge drain below road shoulder

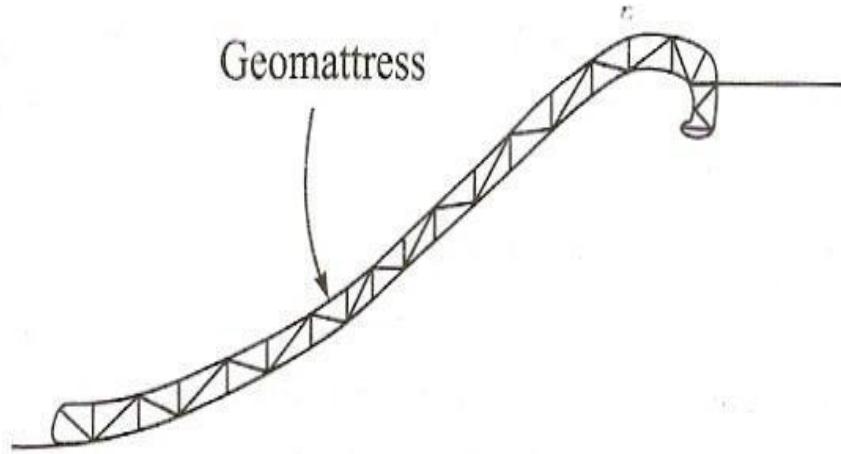
(c) Erosion control

Geosynthetics as transition filters

Sebagai Pelindung terhadap Erosi



(a) Temporary



(b) Permanent

Geosynthetics used to control erosion

Sebagai Drainase

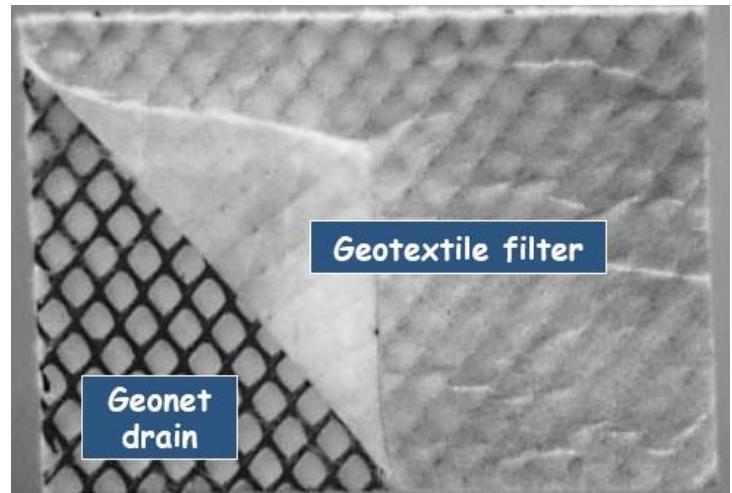
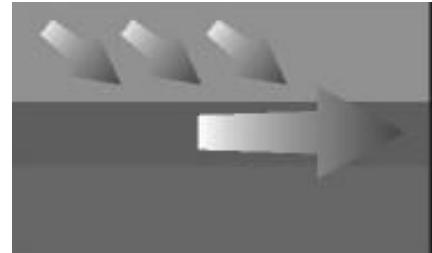
To transfer water, leachate, gas

Along the geosynthetic (in its thickness)

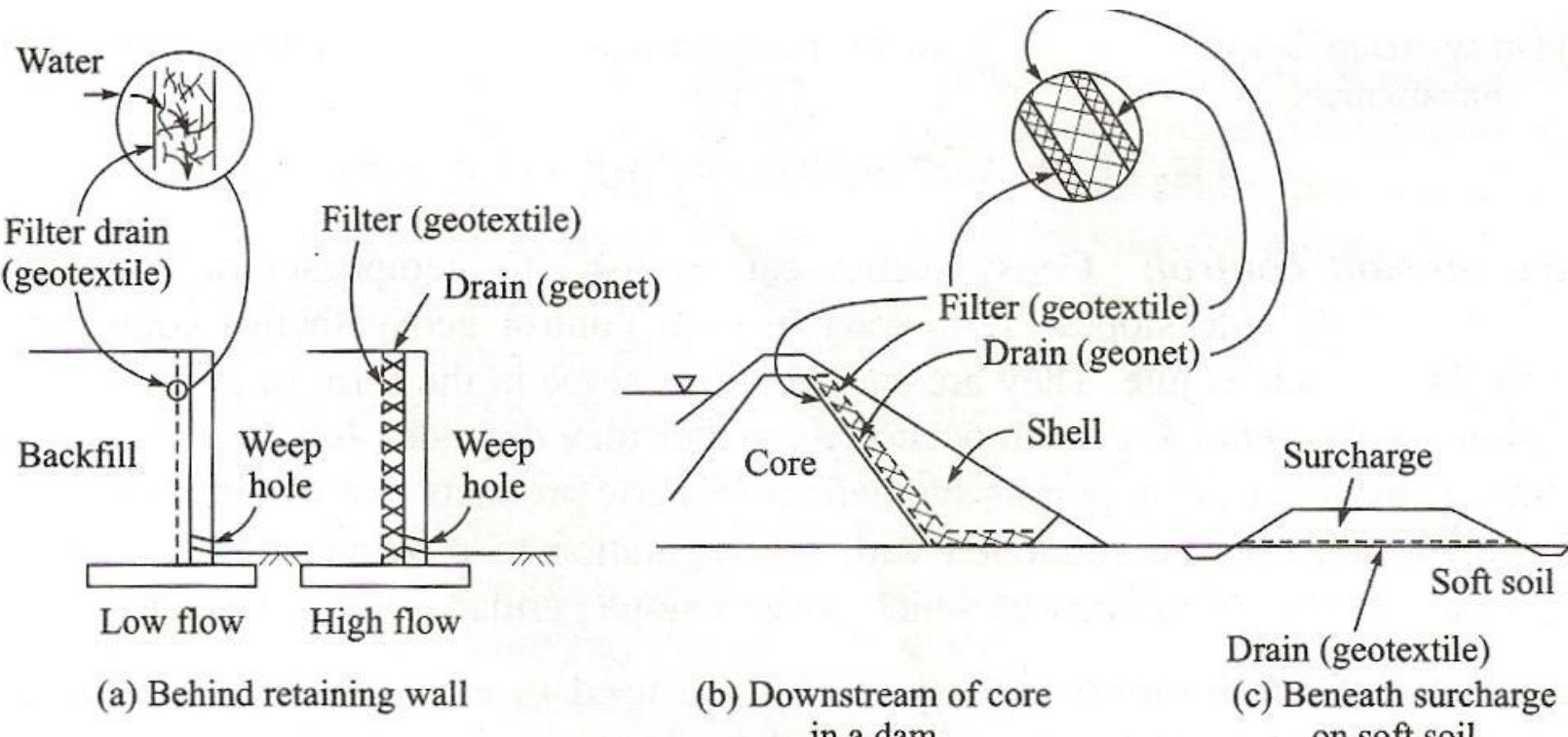
Adequate flow capacity under design loads to convey maximum anticipated seepage during design life

Fabric placed in such a way as to transmit liquid within the plane of their structure provide a drainage function.

Long term performance consideration



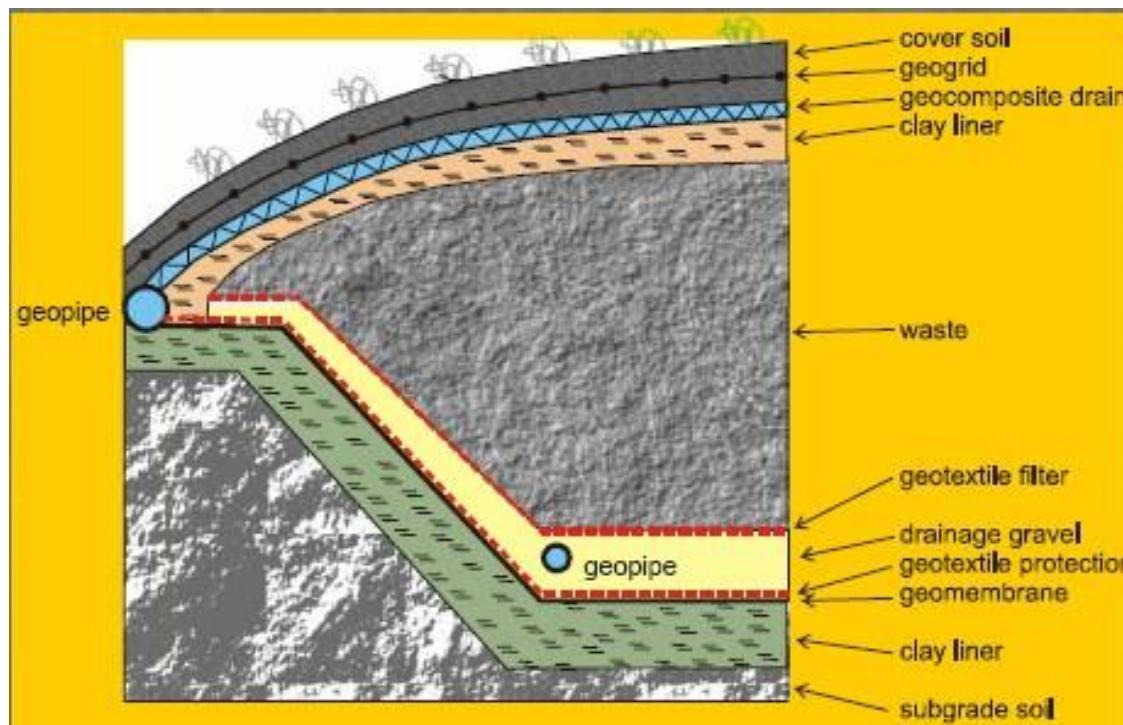
Sebagai Drainase



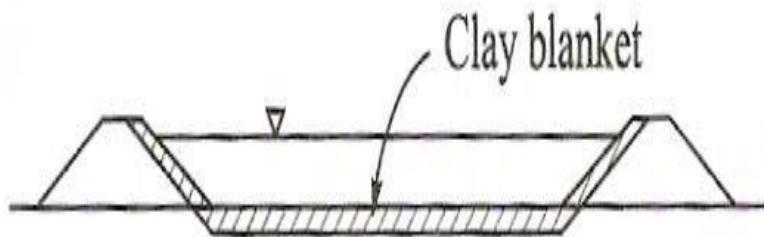
Geosynthetics as drains

Sebagai Containment

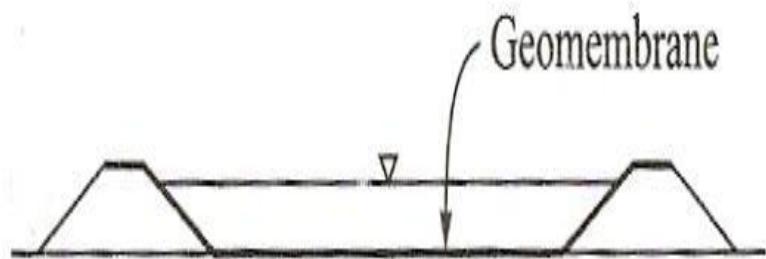
Landfill



Untuk kolam



(a) Lined with clay

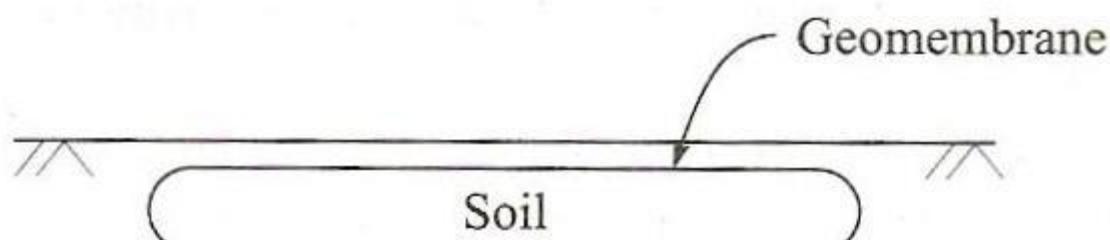


(b) Lined with geomembrane

Using geomembrane for a water storage pond

Sebagai karung (Encapsulation)

Use to encapsulate soil or sediments to a specific geometry and prevent the loss of materials.



Geosynthetics used for encapsulation

Tugas Kelompok

Cari aplikasi geosintetic dalam konstruksi di sekitar kita (Palembang / Sumatera Selatan) dan diskusikan apakah fungsi geosintetik dalam konstruksi tersebut.