
Building on
sustainable
ground.

NAUE ASIA

Ir. Nur Saleehah Raeza

BEng (Hons) | BEM | IEM | ACPE

Technical Manager

saleehah@Naue.com

+6012 – 538 5799

















Ir. Nur Saleehah – Technical Manager

- Bachelor Degree (Hons) in Civil Engineering from University Tenaga Nasional – Malaysia.
- Over 10 years experience as Geotechnical Engineer.
- ASEAN Chartered Professional Engineer (ACPE).
- Designing, supervising geotechnical projects in slope stability, ground improvement, ERSS, piling etc.
- Committed to Best Engineering Practice in developing effective geotechnical solutions

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KDR Myanmar
Geosynthetic Solutions Provider

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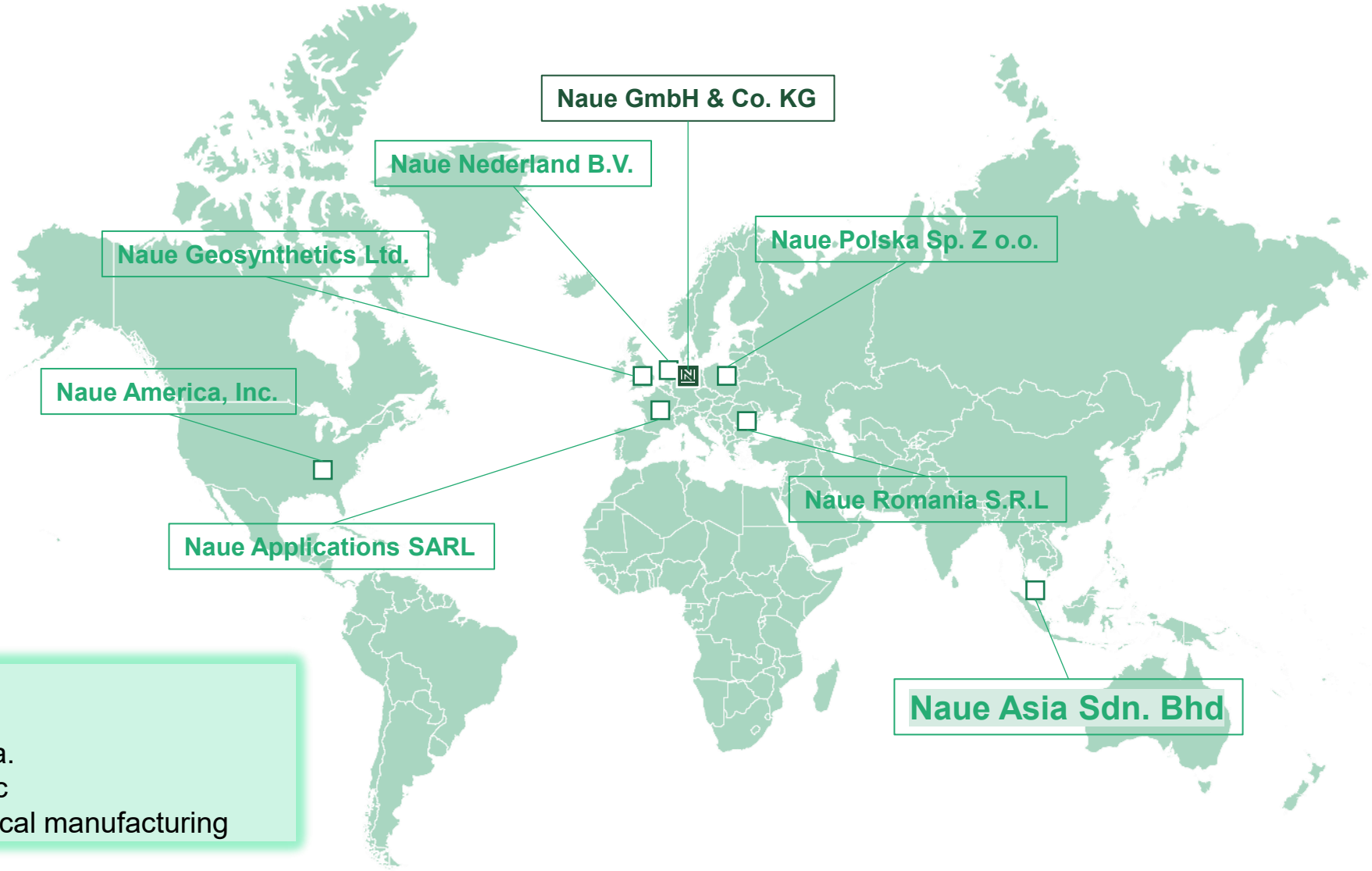
COMPANY BACKGROUND

KDR Myanmar
Geosynthetic Solutions Provider

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Naue Group

- Headquarter
- Naue Group Global Offices



Naue Asia Sdn Bhd

- Located in Malaysia.
- Serving Asia-Pacific
- Global expertise, local manufacturing

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In Myanmar

Our trusted Partner in Myanmar

Website: www.kdrmyanmar.com

Contact numbers:

- +95 9 792 828 559
- +95 9 96501 4662
- +95 19353764

Email: info@kdrmyanmar.com

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Geosynthetic Solutions Provider

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Malaysia Manufacturing Capability

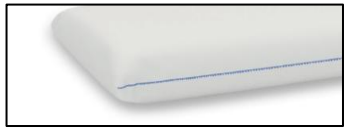
Made in Malaysia, trusted globally

- ✓ Manufacturing facilities in Malaysia
- ✓ Products designed & produced to international standards
- ✓ Advantages:
  - Shorter lead times + German quality
  - Regional Technical Support + Digital Tools
  - In-house laboratory ISO Certification + SAMM Standards Malaysia





Secutex®
Needle-punched staple fibre nonwoven geotextile
2 production lines



Soft Rock
Geosynthetic sand container
1 production line



Bentofix®
Geosynthetic clay liner (GCL)



Bentofix® X
Multi-component GCL (PE coating)

1 production line

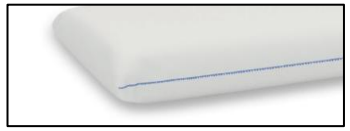
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Overall Product Portfolio



Secutex®
Needle-punched staple fibre nonwoven geotextile



Soft Rock
Geosynthetic sand container



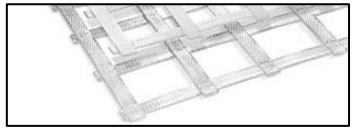
Bentofix®
Geosynthetic clay liner (GCL)



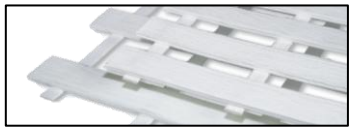
Bentofix® X
Multi-component GCL (PE coating)



Secutex® Green
Biodegradable non-woven



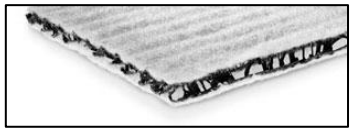
Secugrid®
Geogrid for soil improvement



Secugrid® HS
High Strength Geogrid



Combigrid®
Geogrid with integrated nonwoven



Secudrain®
Three-dimensional drainage



Secumat®
Erosion Control Mat



Carbofol®
Geomembranes

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Certification & Approvals

ISO 9001: 2015
Quality Management:
- Development, production, sales and engineering of geosynthetics

ISO 50001: 2018
Energy Management System:
- Development, production, sales and engineering of geosynthetics

ISO 14001: 2015
Environmental Management System:
- Development, production, sales and engineering of geosynthetics

Certificate of Conformity of Factory Production Control
- Construction Products Regulation

British Board of Agrement: Construction Product Certification
- Bentofix BFG 5000, X2 BFG 5300
- Secugrid Q6, R6 and HS R6

European Organisation for Technical Assessment
- Secugrid® Q1 Series
- Combigrid® Q1 Series

Quality Control & Assurance

Independent Lab Testing

TRI / Environmental, Inc.
A Texas Research International Company

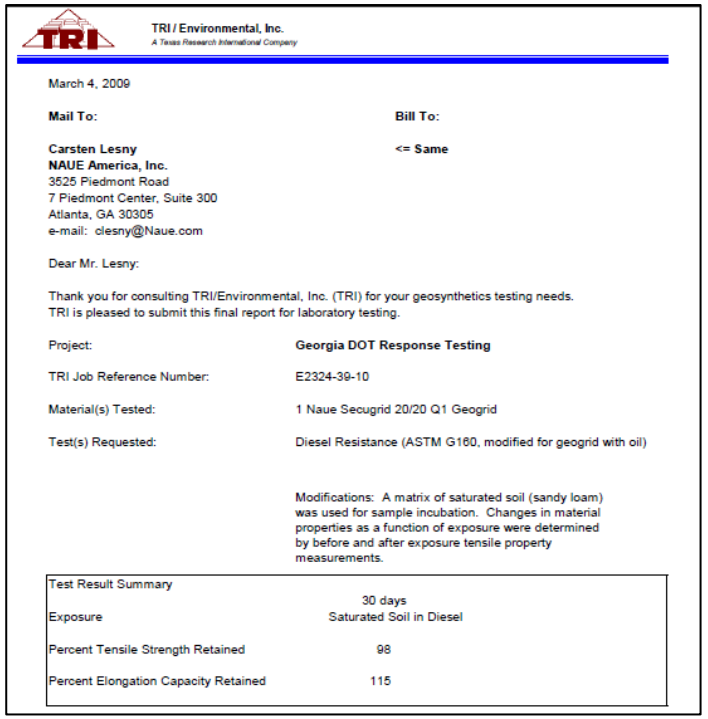
kiwa
Partner for progress

tBU
Institut für textile Bau- und Umwelttechnik GmbH
Akkreditiertes Labor
GAZ-P-98-62-12-21-02

MPA HANNOVER

GeoTesting EXPRESS
Technologies to manage risk for infrastructure

Universität Rostock
Traditio et Innovatio



TRI / Environmental, Inc.
A Texas Research International Company

March 4, 2009

Mail To:

Carsten Lesny
NAUE America, Inc.
3525 Piedmont Road
7 Piedmont Center, Suite 300
Atlanta, GA 30305
e-mail: clesny@Naue.com

Bill To:

<= Same

Dear Mr. Lesny:

Thank you for consulting TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs.
TRI is pleased to submit this final report for laboratory testing.

Project:	**Georgia DOT Response Testing**
TRI Job Reference Number:	E2324-39-10
Material(s) Tested:	1 Naue Secugrid 20/20 Q1 Geogrid
Test(s) Requested:	Diesel Resistance (ASTM G160, modified for geogrid with oil)

Modifications: A matrix of saturated soil (sandy loam) was used for sample incubation. Changes in material properties as a function of exposure were determined by before and after exposure tensile property measurements.

Test Result Summary	
Exposure	30 days Saturated Soil in Diesel
Percent Tensile Strength Retained	98
Percent Elongation Capacity Retained	115

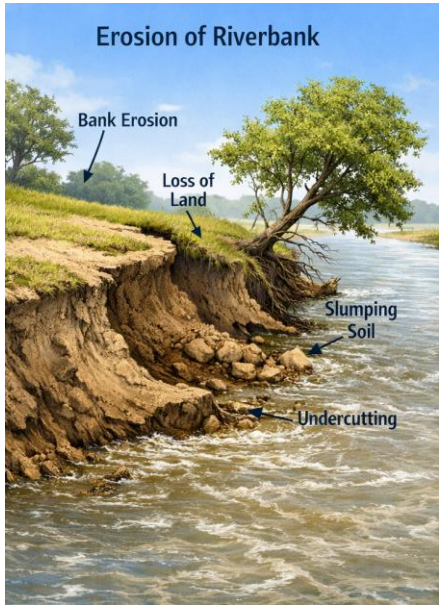
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Geosynthetic Solutions Provider

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UNDERSTANDING CURRENT INFRASTRUCTURE PROBLEM

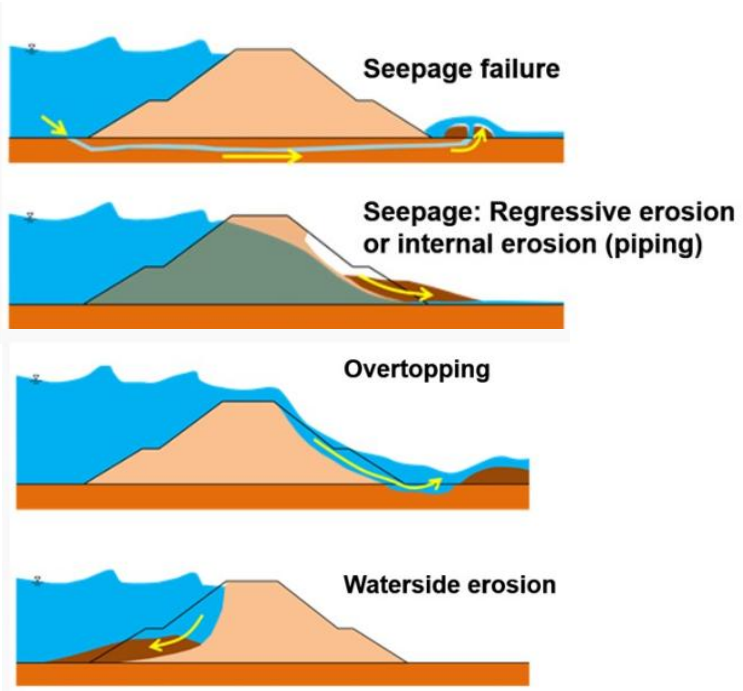
The Challenges

- Riverbank erosion and flood protection
- Road failures and slope instability
- Solid waste management
- Wastewater management and water pollution









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What are geosynthetics and why are they important?

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Geosynthetics are synthetic materials, predominantly made from polymers, used in contact with soil, rock or other geotechnical materials to improve the performance of civil engineering and environmental infrastructure.

Function	Engineering purpose
Separation	Prevent mixing of dissimilar soil materials
Filtration	Allow water to pass while retaining soil particles
Drainage	Collect and transport water or other fluids
Reinforcement	Improve soil strength and stability
Protection	Protect other materials against mechanical damage
Barrier	Restrict the movement of liquids or gases
Erosion control	Protect soil surfaces against erosion

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Common Types of Geosynthetics

Type	Material Structure	Primary Function	Common Use Case
Geotextiles	Permeable woven or non-woven fabrics	Separation, Filtration, Drainage, Reinforcement	Road bases, under railway tracks, behind retaining walls
Geogrids	Regular grid-like networks with large open apertures	Soil Reinforcement, Stabilization	Steep slopes, retaining walls, heavy load support
Geomembranes	Low-permeability continuous sheets	Containment, Fluid Barrier	Landfill liners, artificial lakes, mining ponds
Geonets	Ribbed, open net structures	In-plane Drainage	Drainage collection systems in landfills and walls
Geosynthetic Clay Liners (GCLs)	Sodium bentonite clay sandwiched between geotextiles, self-sealing barrier	Containment, Hydraulic Barrier	Environmental containment, canal linings
Geocomposites	Hybrids combining two or more geosynthetic types	Multiple simultaneous functions	Complex foundation drainage, advanced pavement layers

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Raw Material of Geotextile

Polypropylene (PP)

- highly resistant to acids, alkalis, salts, and most chemicals
- does not absorb water (hydrophobic)
- inert to fungi, bacteria, and microorganisms

Polyester (PET)

- degrade in high-alkaline environments (e.g., concrete contact, lime-treated soils)
- absorbs moisture, which can slightly reduce strength over time
- can be more susceptible in certain biological environments

Polypropylene non-woven geotextiles are generally preferred for filtration, separation, drainage, and chemical-resistant applications (landfill etc.).

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Geosynthetics for Road Infrastructure

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The Challenges





The Challenges

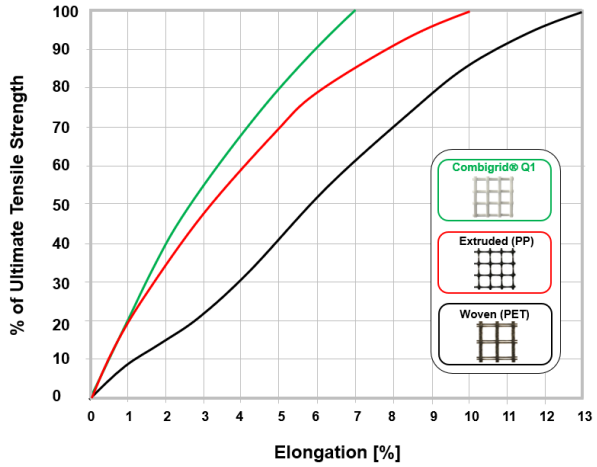


Feature:
High in-plane stiffness / rigidity

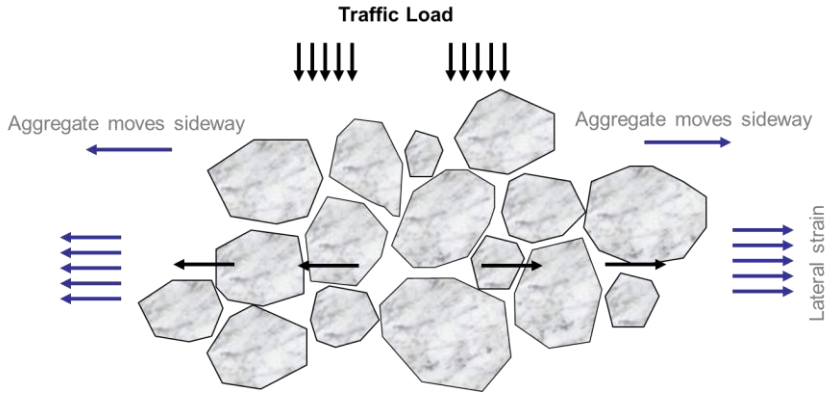
Advantage:
Increased resistance against vertical stresses

Benefit:

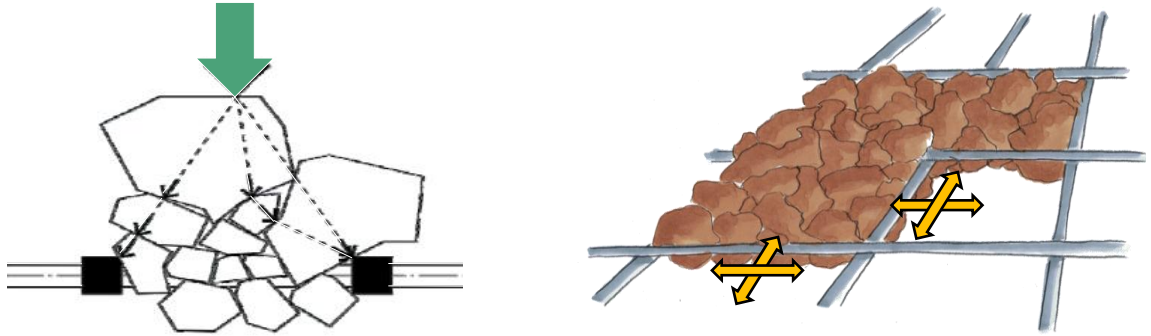
- Increased resistance against soil deformation
- Increased lifespan of road infrastructure
- Reduced fill thickness
- Time/Cost savings



Civil Engineering – Base Course Reinforcement



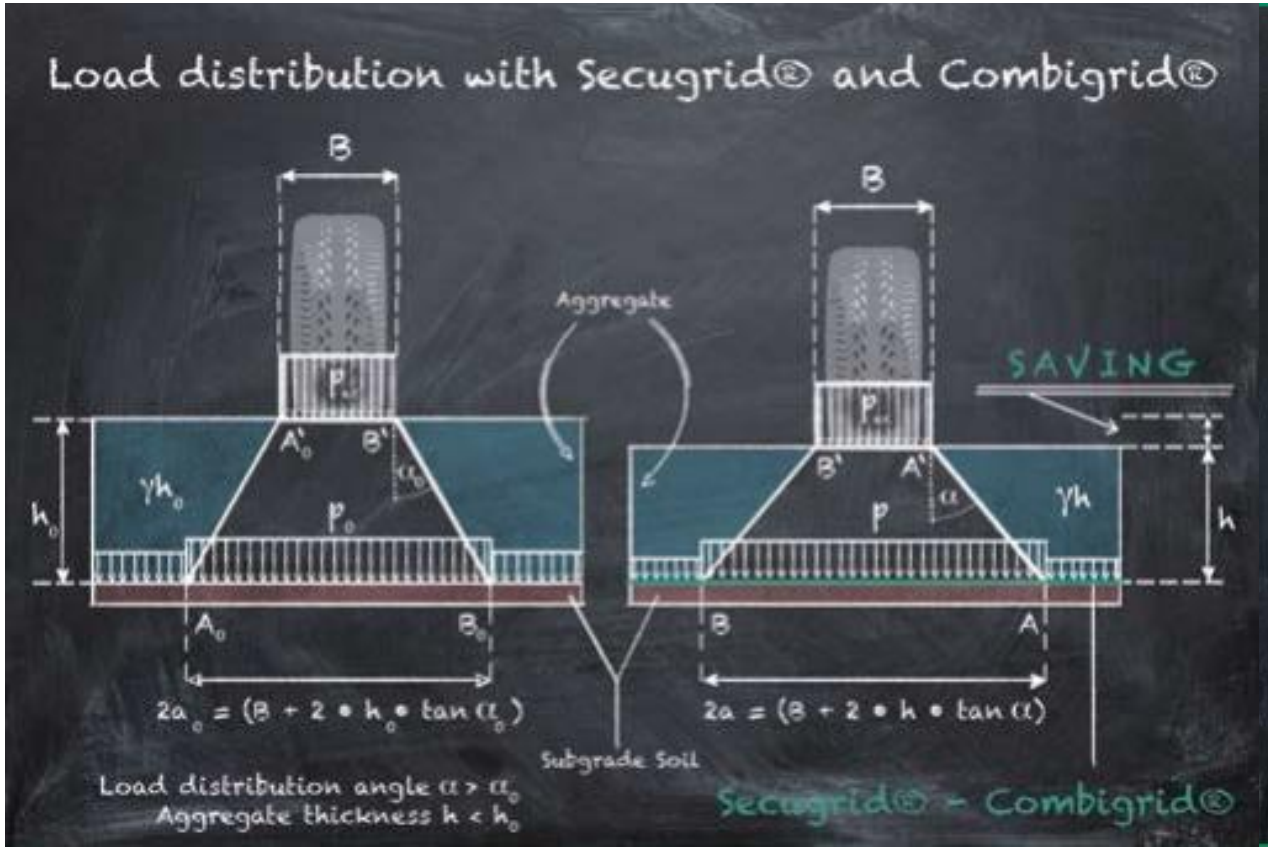
No geogrid reinforcement

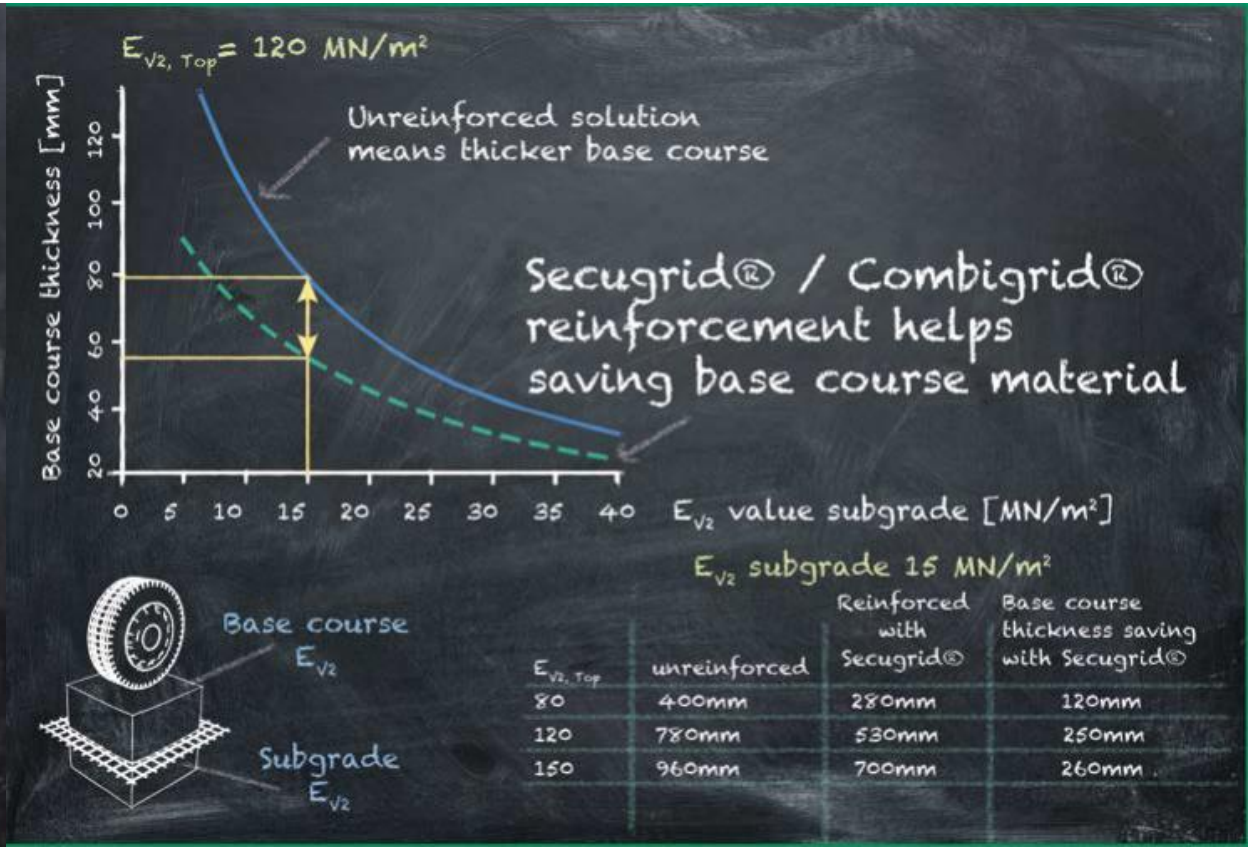




- Geogrids interlocks with aggregates. (Radial interlocking)
- Better stress distribution through geogrids.
- Minimize pumping, rutting and aggregate thickness.

Civil Engineering – Road Design





$E_{V2, Top}$	unreinforced	Reinforced with Secugrid®	Base course thickness saving with Secugrid®
80	400mm	280mm	120mm
120	780mm	530mm	250mm
150	960mm	700mm	260mm

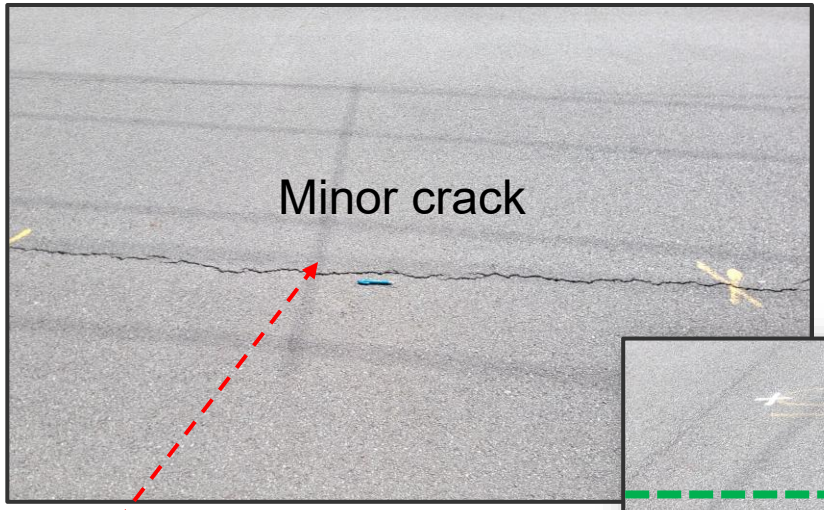
Geogrid can reduce the thickness of base course to achieve same CBR value.

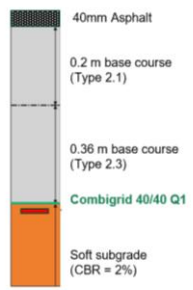
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Roads on weak subgrades

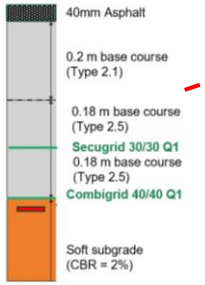
Paved road test section, Bannockburn Road, Logan City Council, Australia (2018)

Visual inspection of pavement surface after 5 years

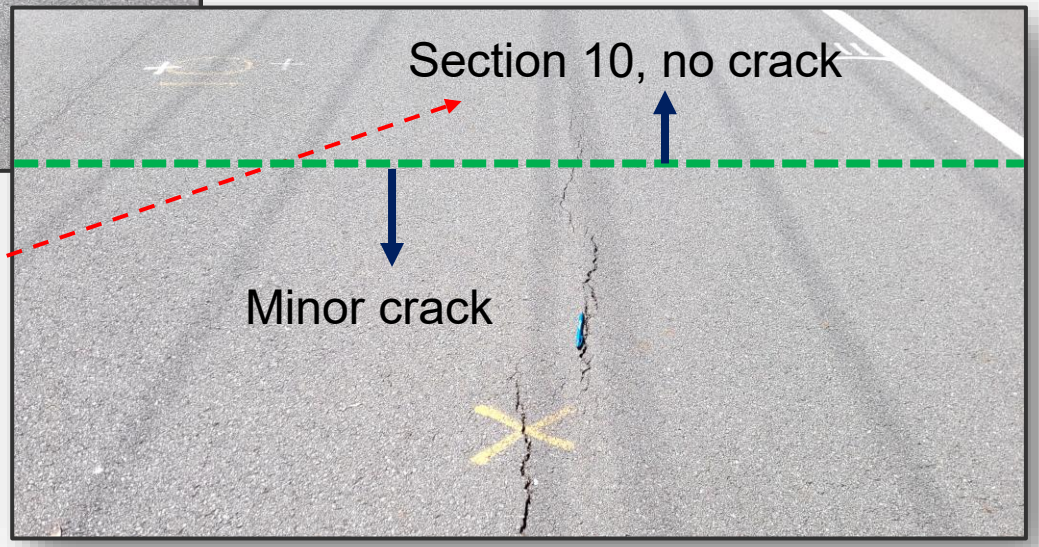




Section #9



Section #10





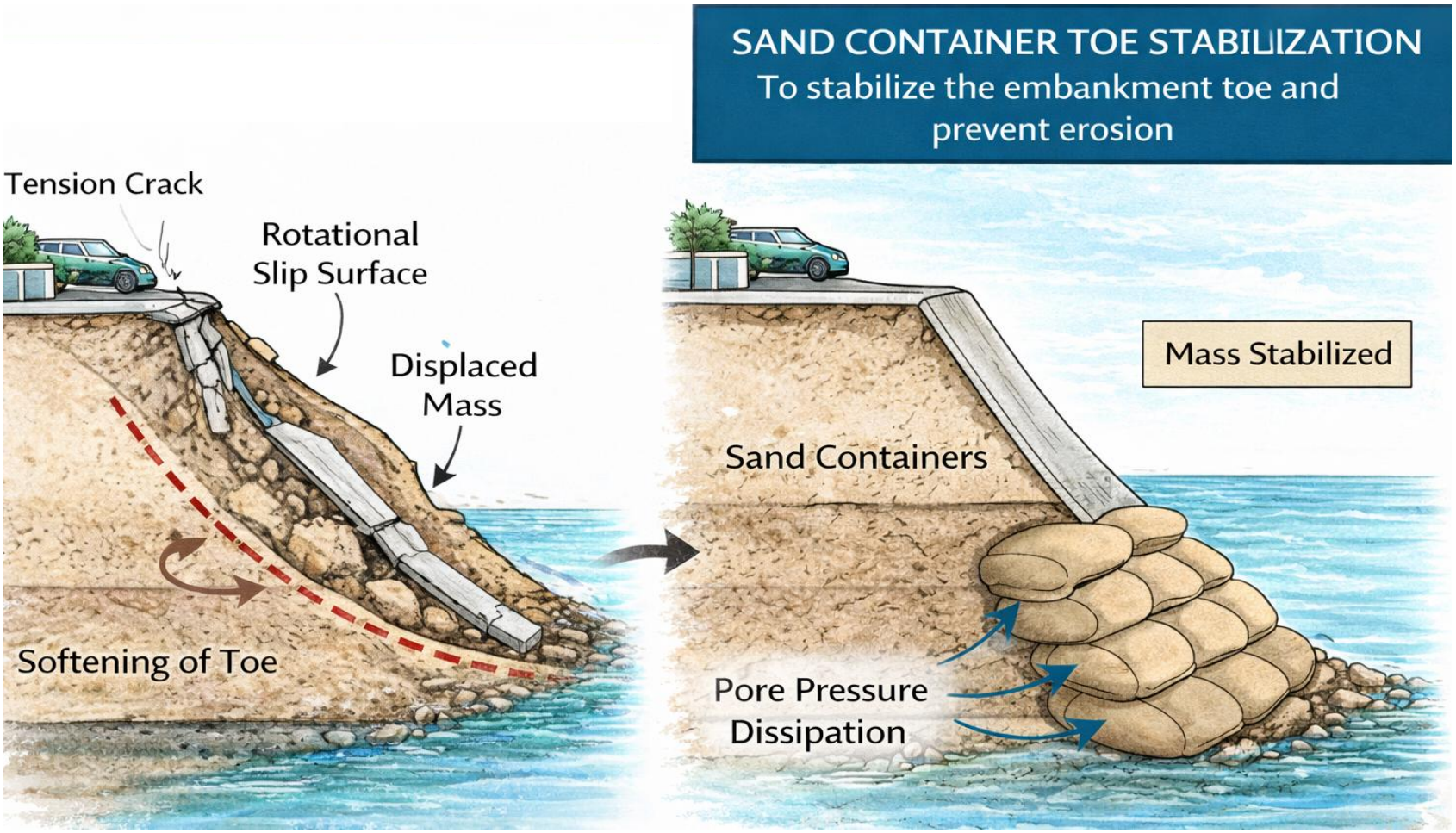
Section with no geogrid
Major crack

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Geosynthetics for Slopes & Earth Surfaces

The Challenges





Concrete Surface Failure



Concrete Mattress + GSC

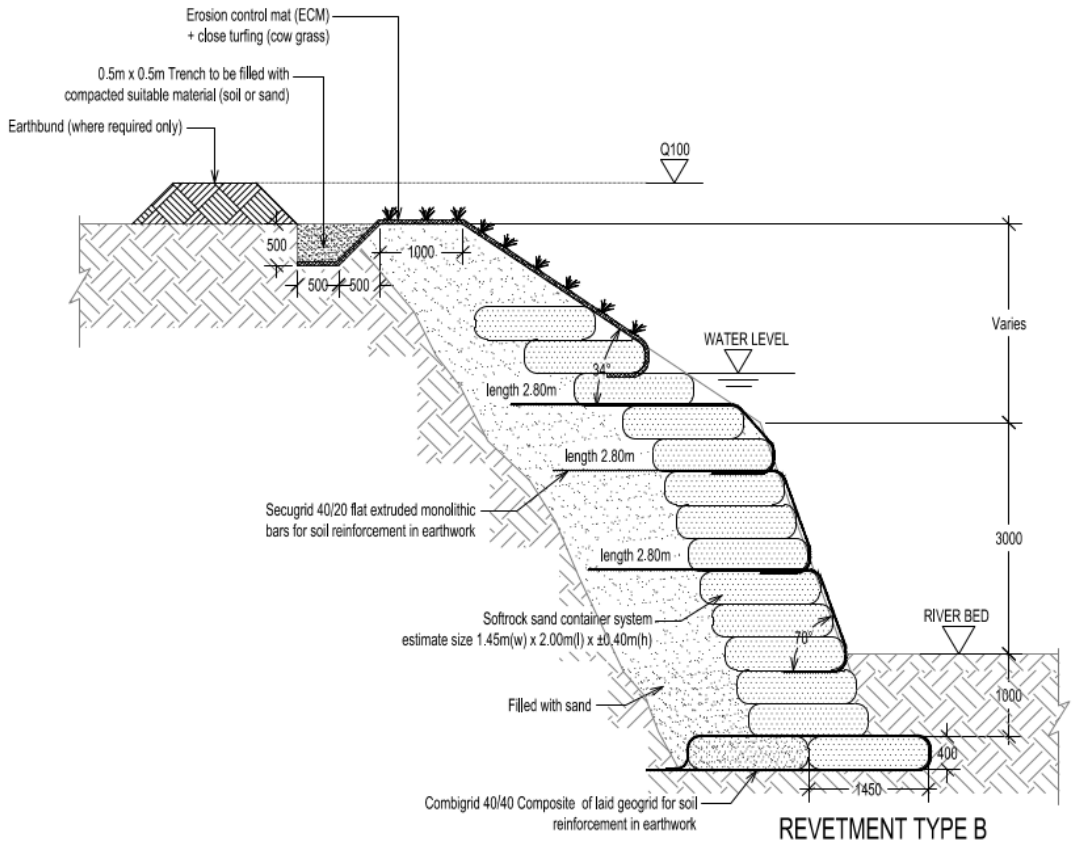
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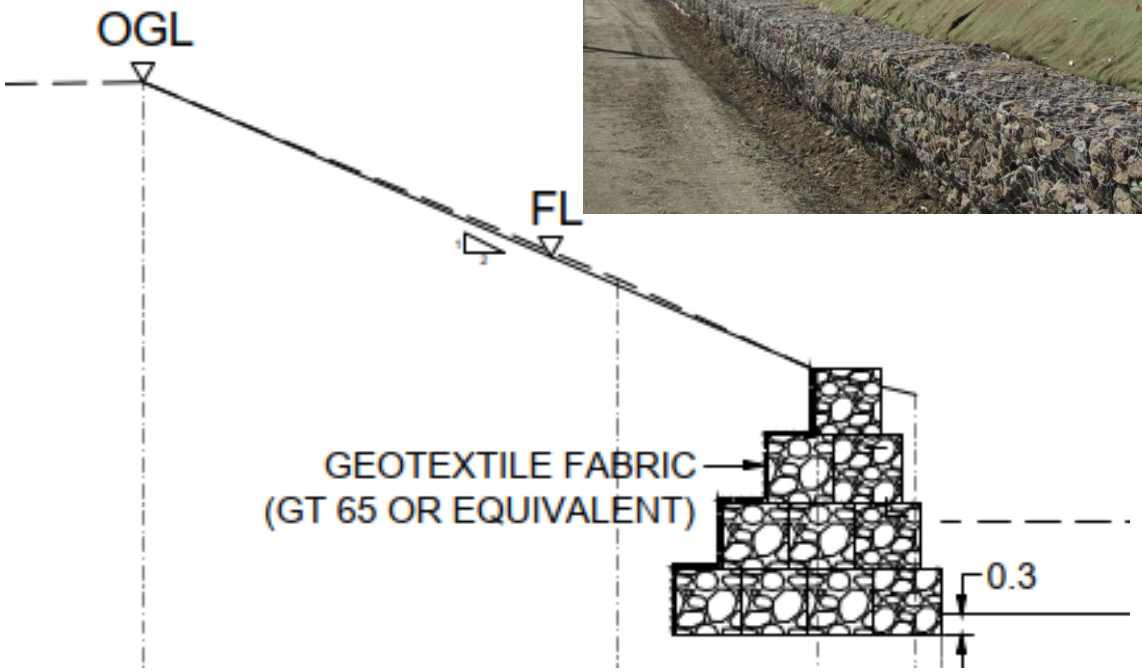
Strengthening Our Surroundings: Geosynthetics for Riverbank

SG. DAMANSARA, MYS





REVETMENT TYPE B - TYPICAL DETAILS



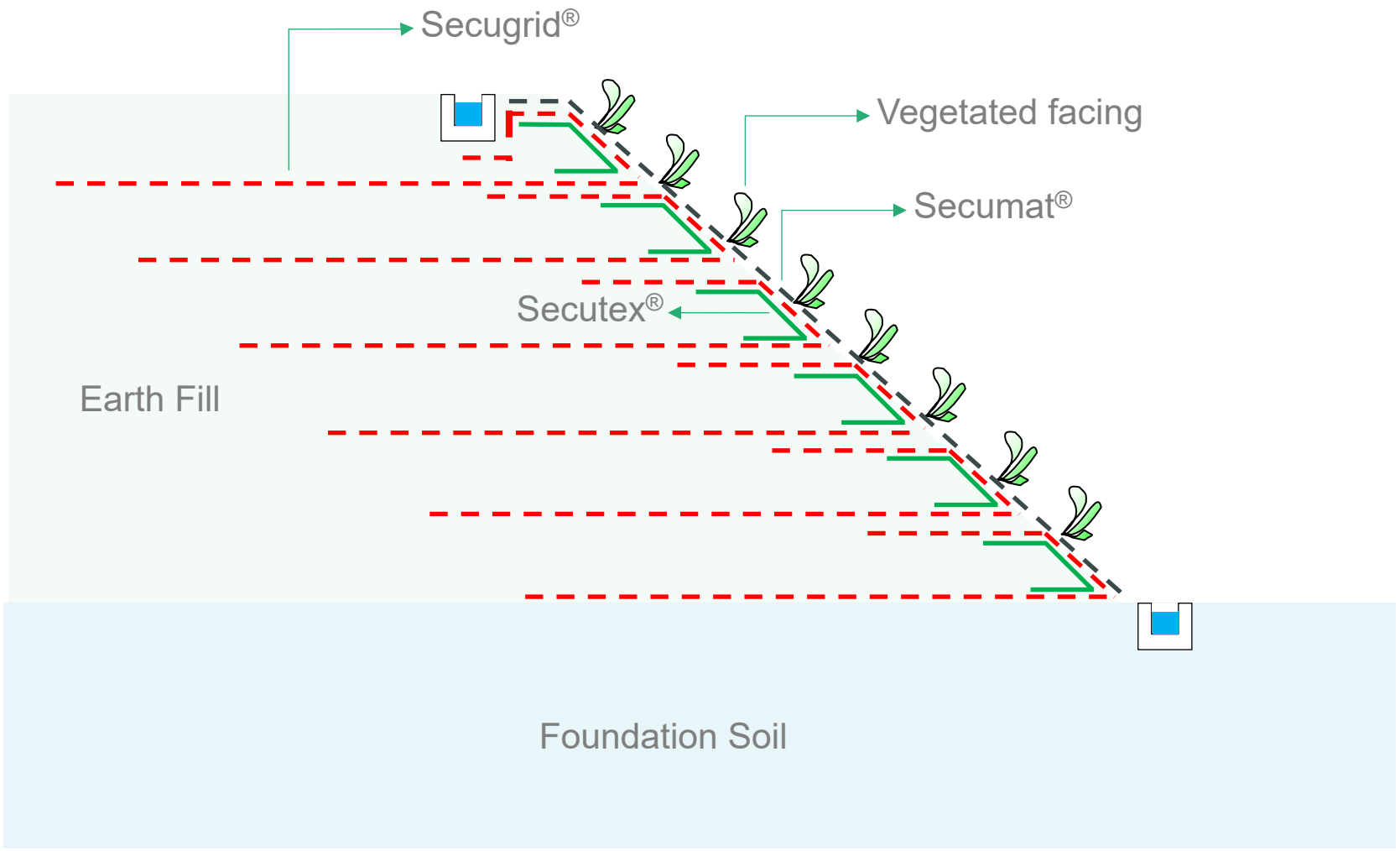
GABION WALL TYPICAL DETAILS

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Civil Engineering – Slope/Wall Reinforcement



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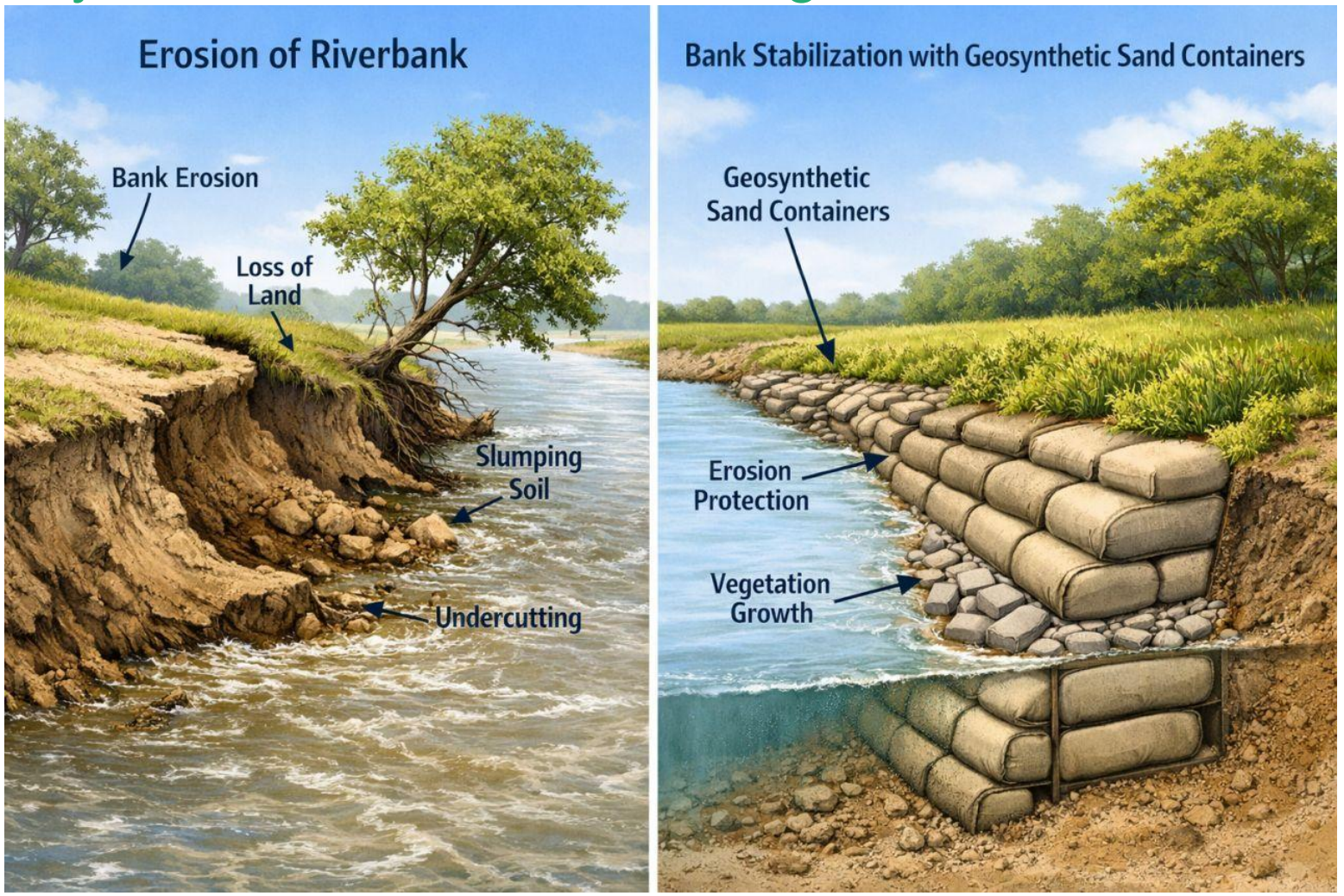
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Geosynthetics for Water & Hydraulic Structure

The Challenges



Key Mechanisms in Preventing Soil Loss



In hydraulic engineering, sand containers (or geotextile sandbags) are often specified to control this process. Their function is not just "because they are commonly used," but because of how they work:

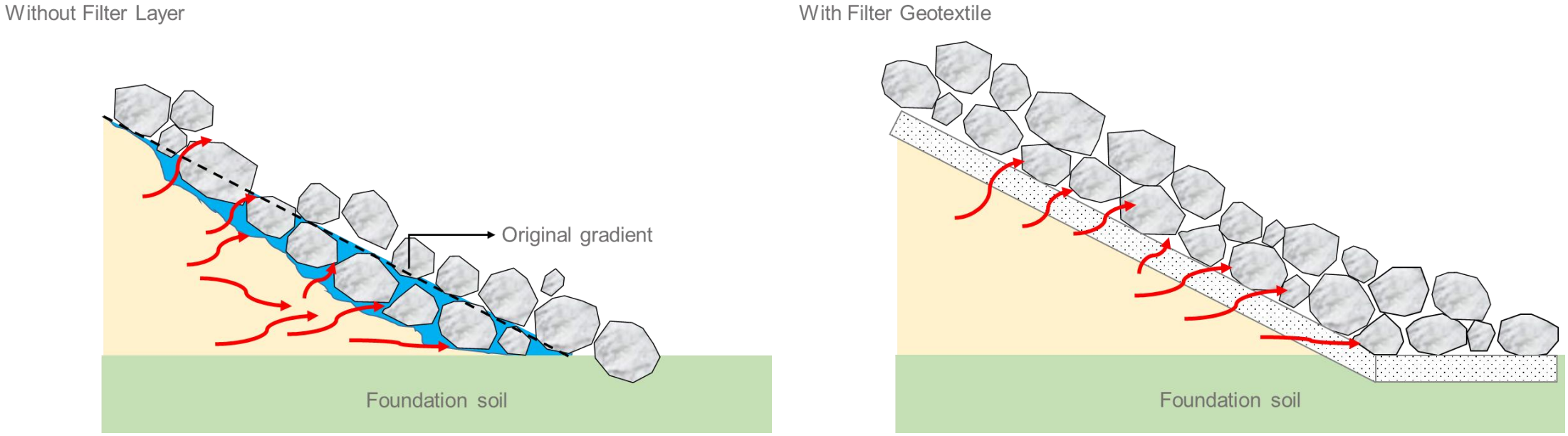
- They encapsulate soil particles of a selected grain size, while still allowing water to pass through.
- They reduce scour when placed around or in front of hydraulic structures.
- They conform to the shape of the subgrade layer, minimizing gaps where flowing water could initiate erosion.

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Key Mechanisms in Preventing Soil Loss

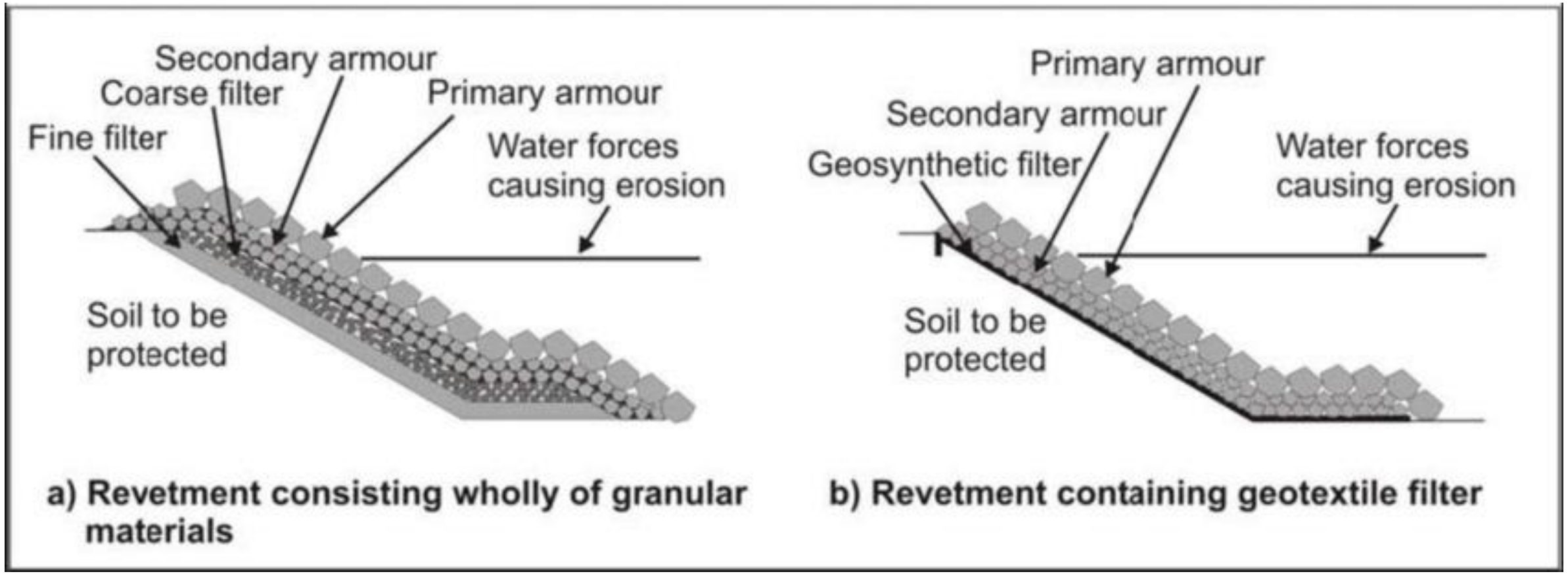
Geotextile Filtration & Drainage:

- **Erosion Control**: Prevents soil from being washed away by water flow.
- **Separation of Soil Layers**: Prevents the intermixing of soil types.
- **Drainage Management**: Facilitates the efficient removal of water in trenches and drains while retaining soil.
- **Improved Water Quality**: Filters out sediment and pollutants, such as phosphorus, from runoff.



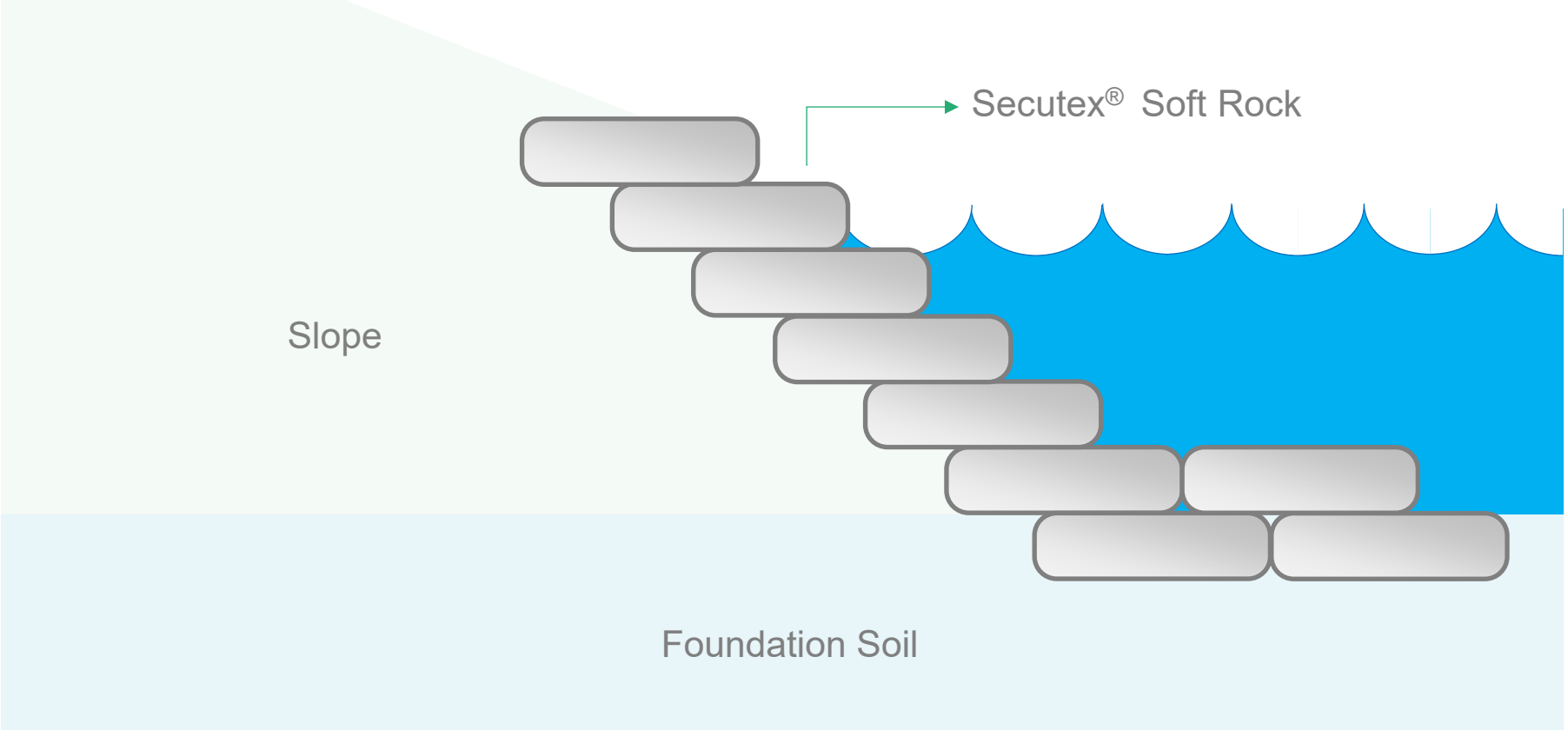
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Civil Engineering – Drainage System



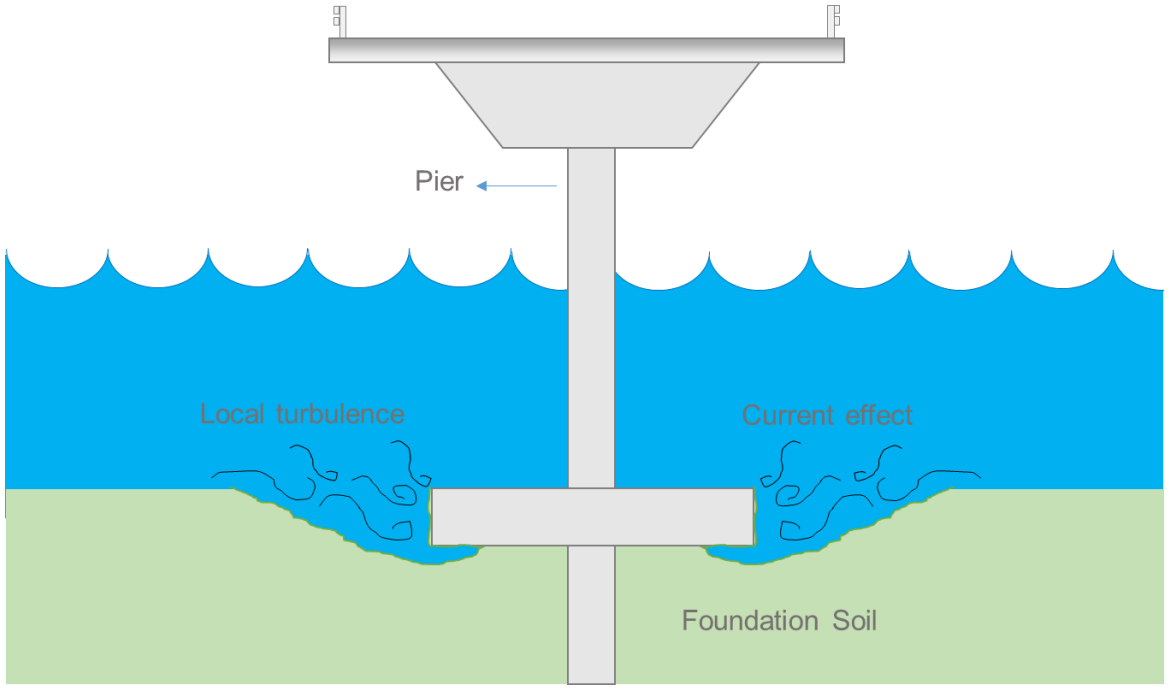
Geosynthetic can reduce the thickness/requirement in conventional drainage method using aggregates / sand.

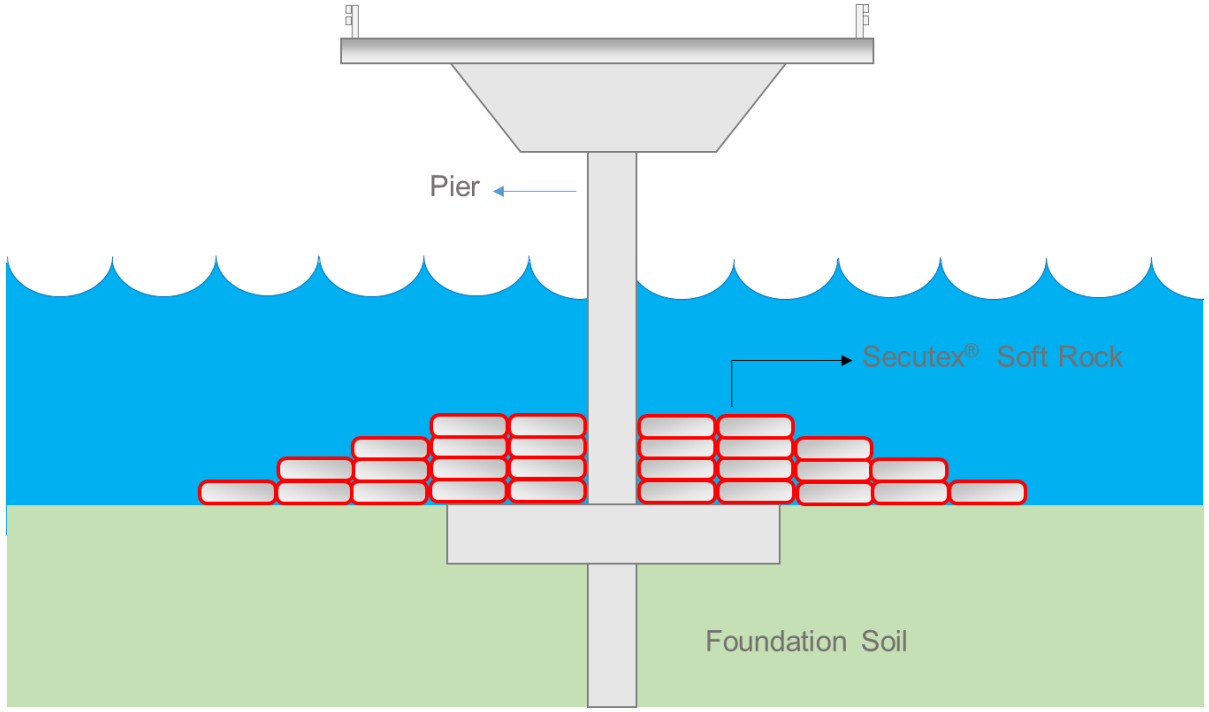
Hydraulic Engineering – Scour / Riverbank Protection



- Geotextile encapsulated bags act as a filter which prevent current erodes riverbank or coastline.

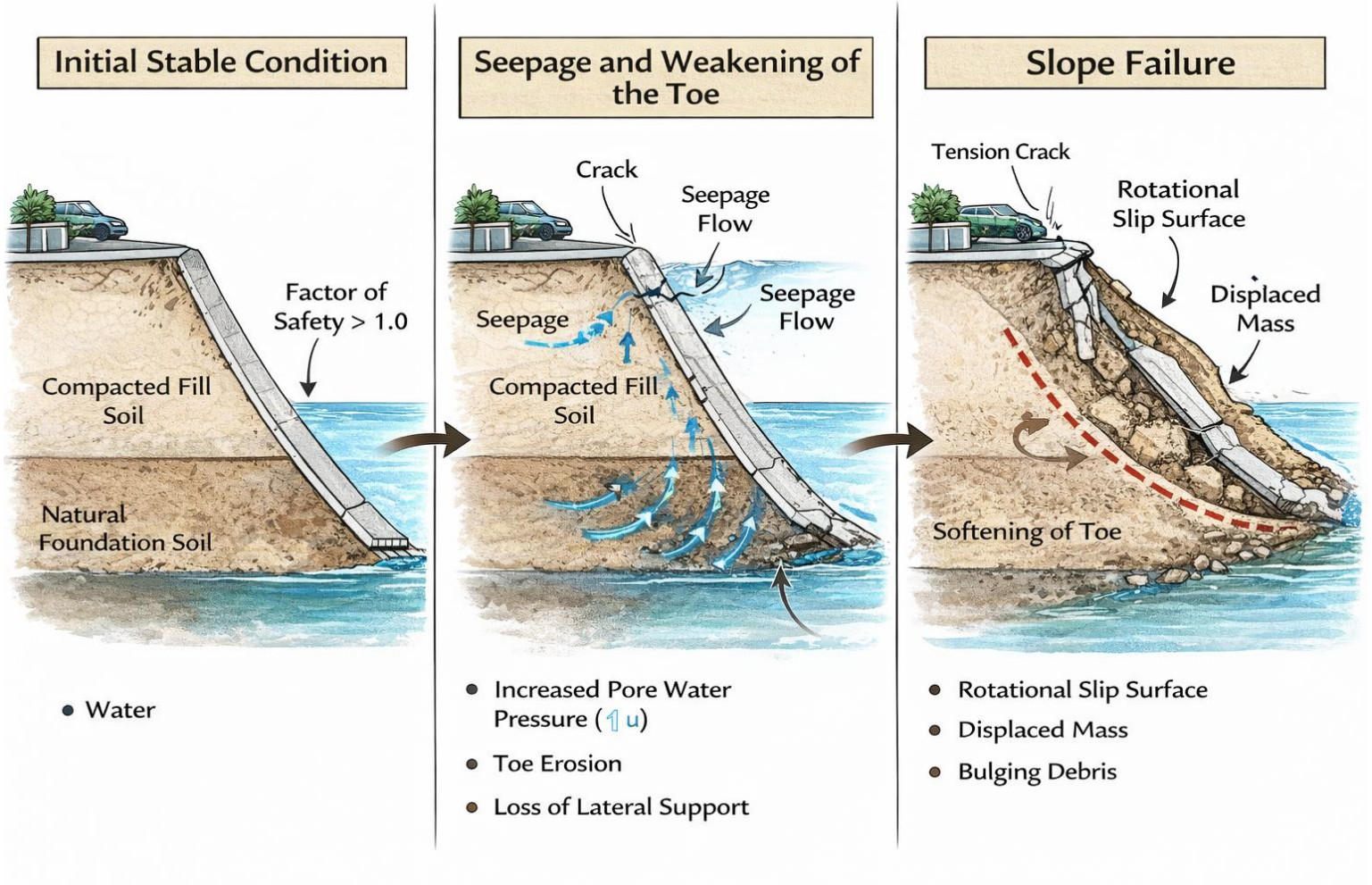
Hydraulic Engineering – Scour Protection



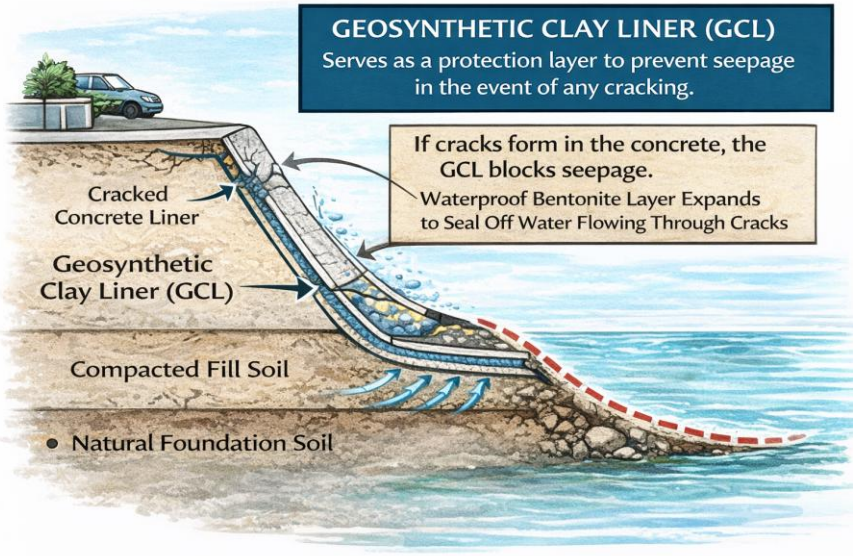


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Civil Engineering – Seepage Control on Concrete



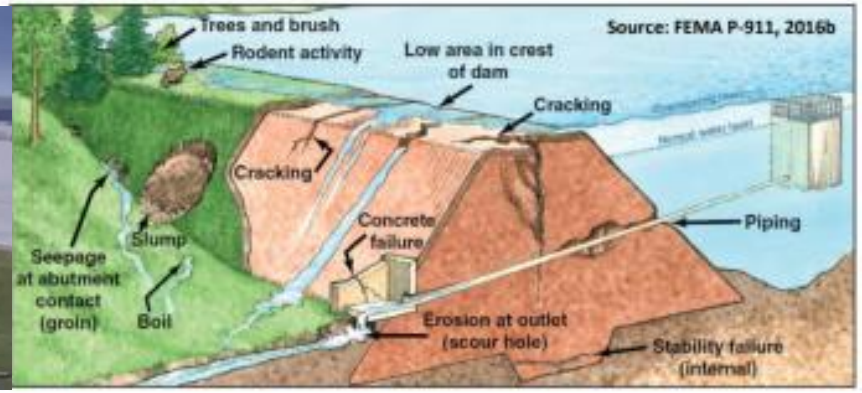
Ways to Prevent

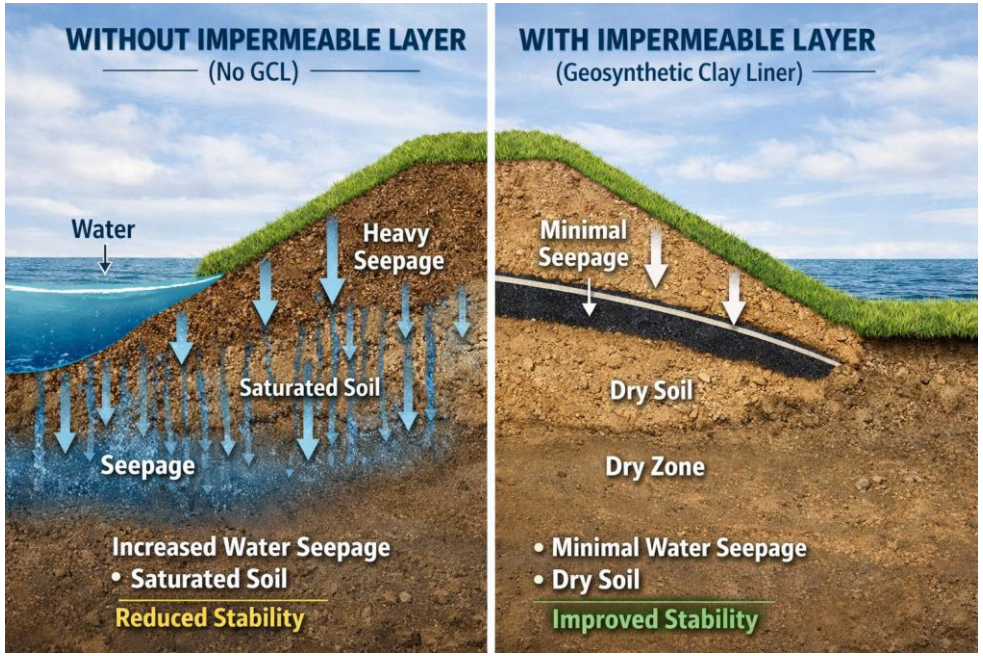


Water Seepage in Flood Embankment / Levees

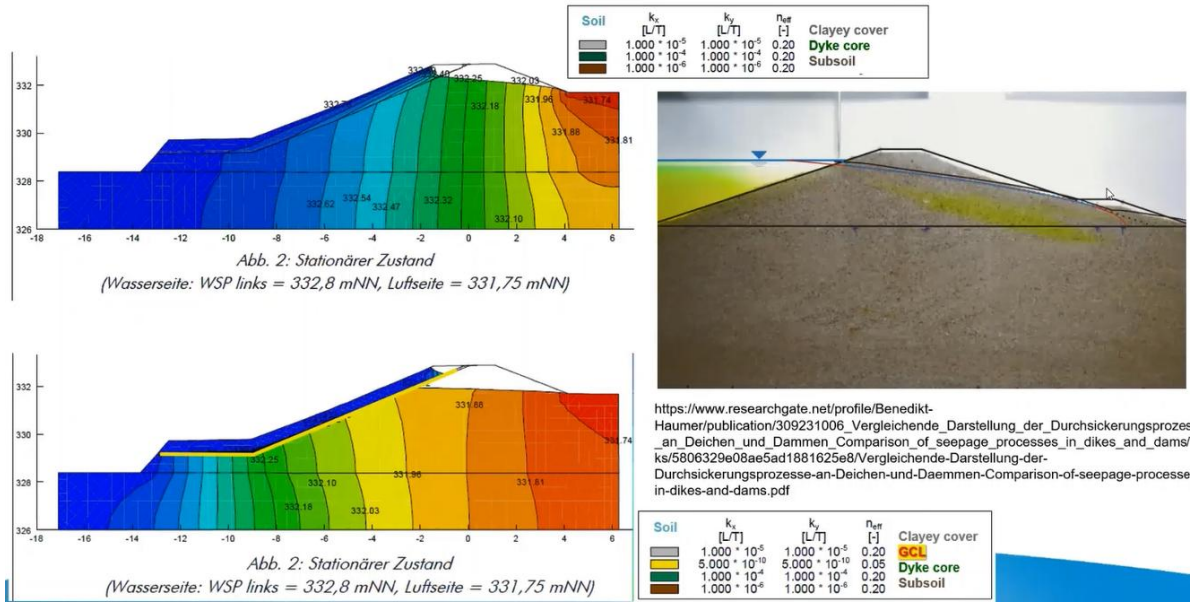
When water moves through an embankment, it raises pore water pressure, reduces the effective stress between soil grains, and can cause erosion, saturating and weaken the soil strength.







Permeation Through the Levees



https://www.researchgate.net/profile/Benedikt-Haumer/publication/309231006_Vergleichende_Darstellung_der_Durchsickerungsprozes_an_Deichen_und_Dammen_Comparison_of_seepage_processes_in_dikes_and_dams/ks/5806329e08ae5ad1881625e8/Vergleichende-Darstellung-der-Durchsickerungsprozesse-an-Deichen-und-Daemmen-Comparison-of-seepage-processe in-dikes-and-dams.pdf

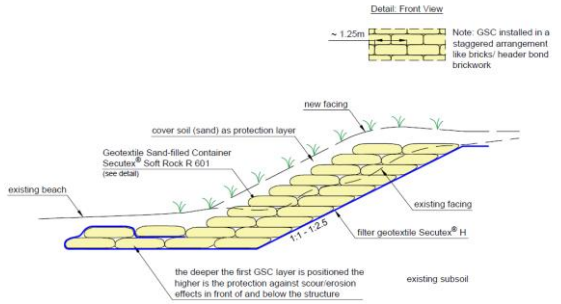
Challenges on Sand Containers

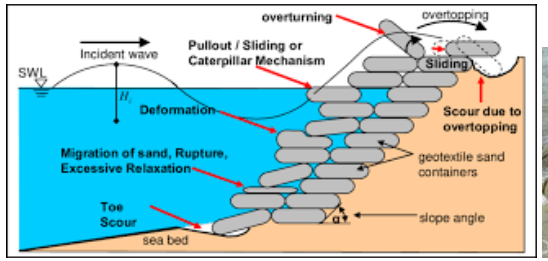




- Material (Woven or Non-woven)
- Shape / Dimension
- Arrangement / Placement
- Filling Material (Fine sand escapes through the geotextile.)

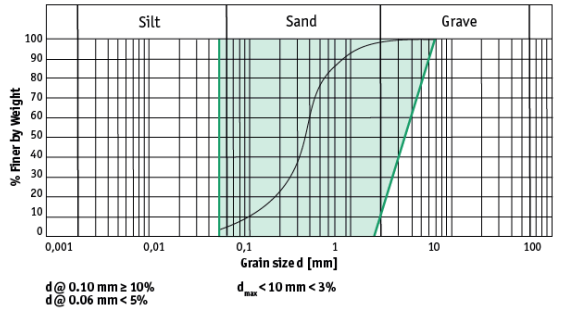








- ✓ Incorrect geotextile opening size (AOS)
- ✓ Poor-quality seams or stitching
- ✓ Result: Gradual loss of container volume & weight, leading to structural weakness.



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Geosynthetics for Environmental Applications

The Challenges

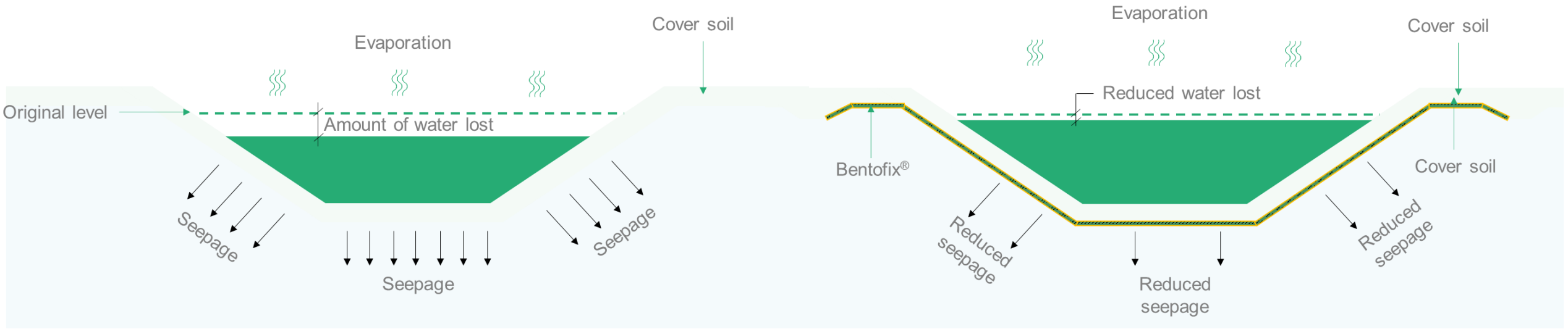




Civil Engineering – Impoundment

Without Geosynthetics Clay Liner

With Geosynthetics Clay Liner



- Applicable for civil infrastructure (detention or retention pond) when seepage barrier is required to prevent soil saturation cause to shear failure.
- Geosynthetic Clay Liners (GCLs) provide an effective hydraulic barrier that minimizes the migration of leachate and harmful contaminants from waste into the surrounding soil and groundwater.

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Civil Engineering – Landfill Management

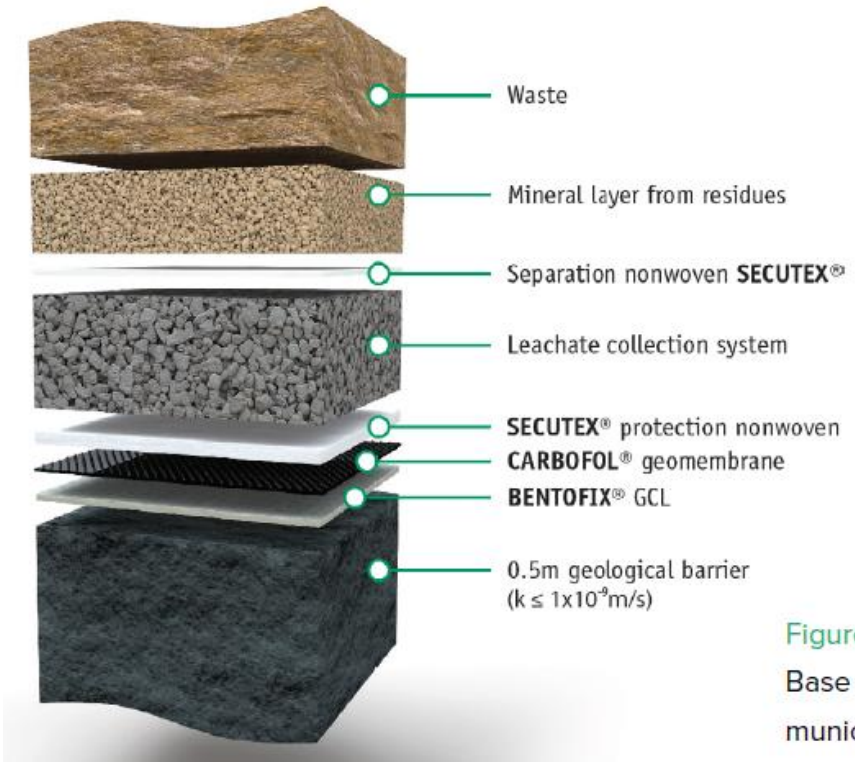


Figure 1:
Base sealing system for municipal solid waste landfills



Figure 3: Cap/closure system for municipal solid waste landfills

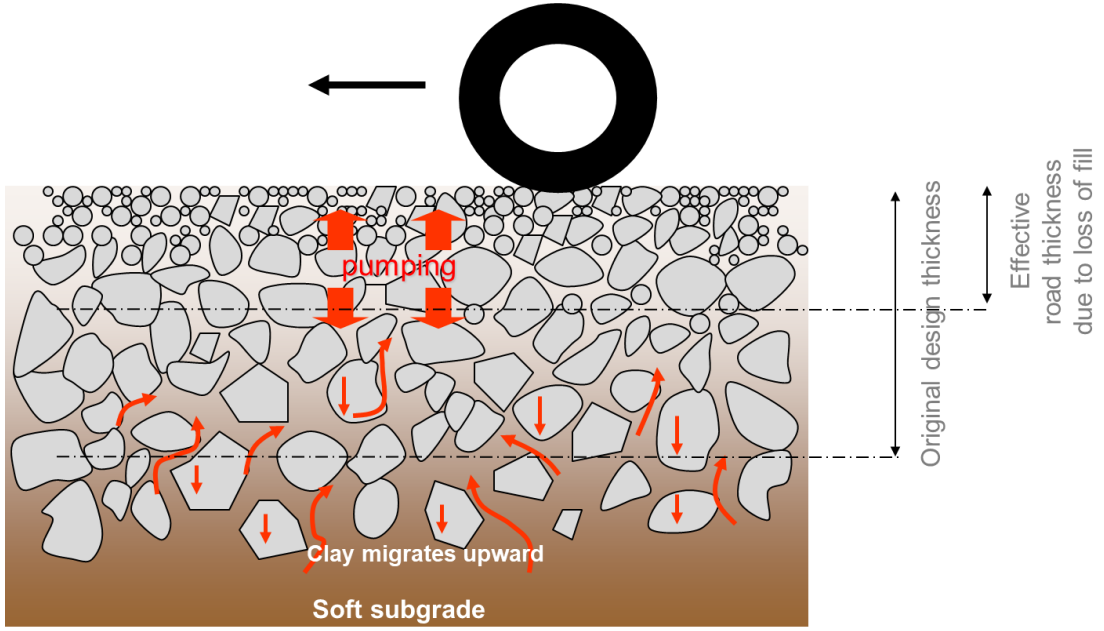
Geotextiles for Filtration, Separation & Drainage

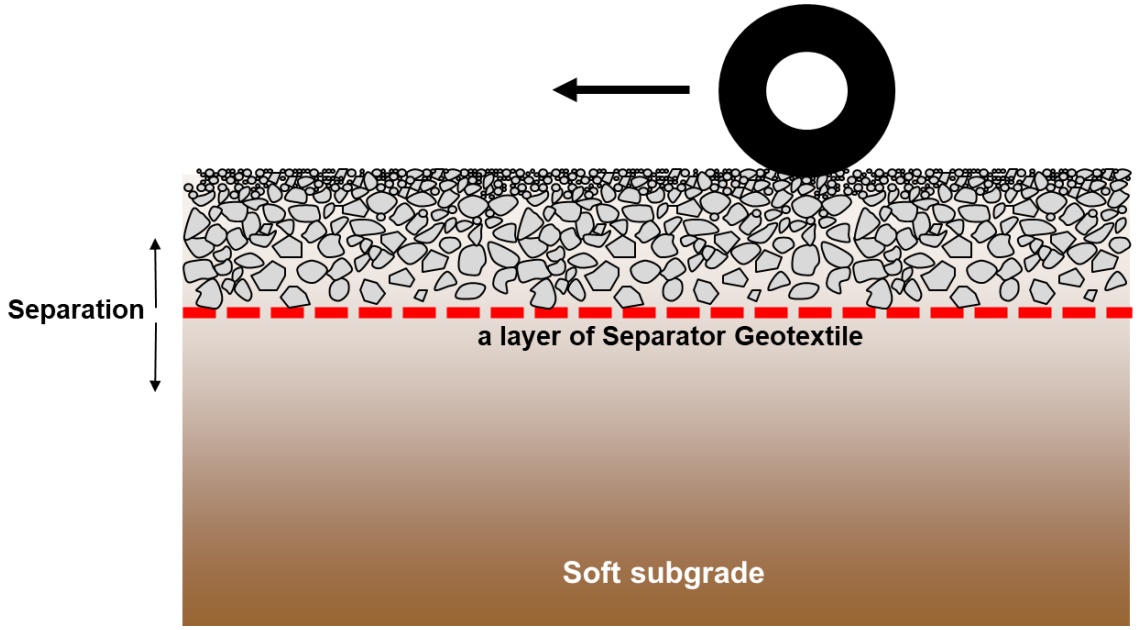
The Challenges





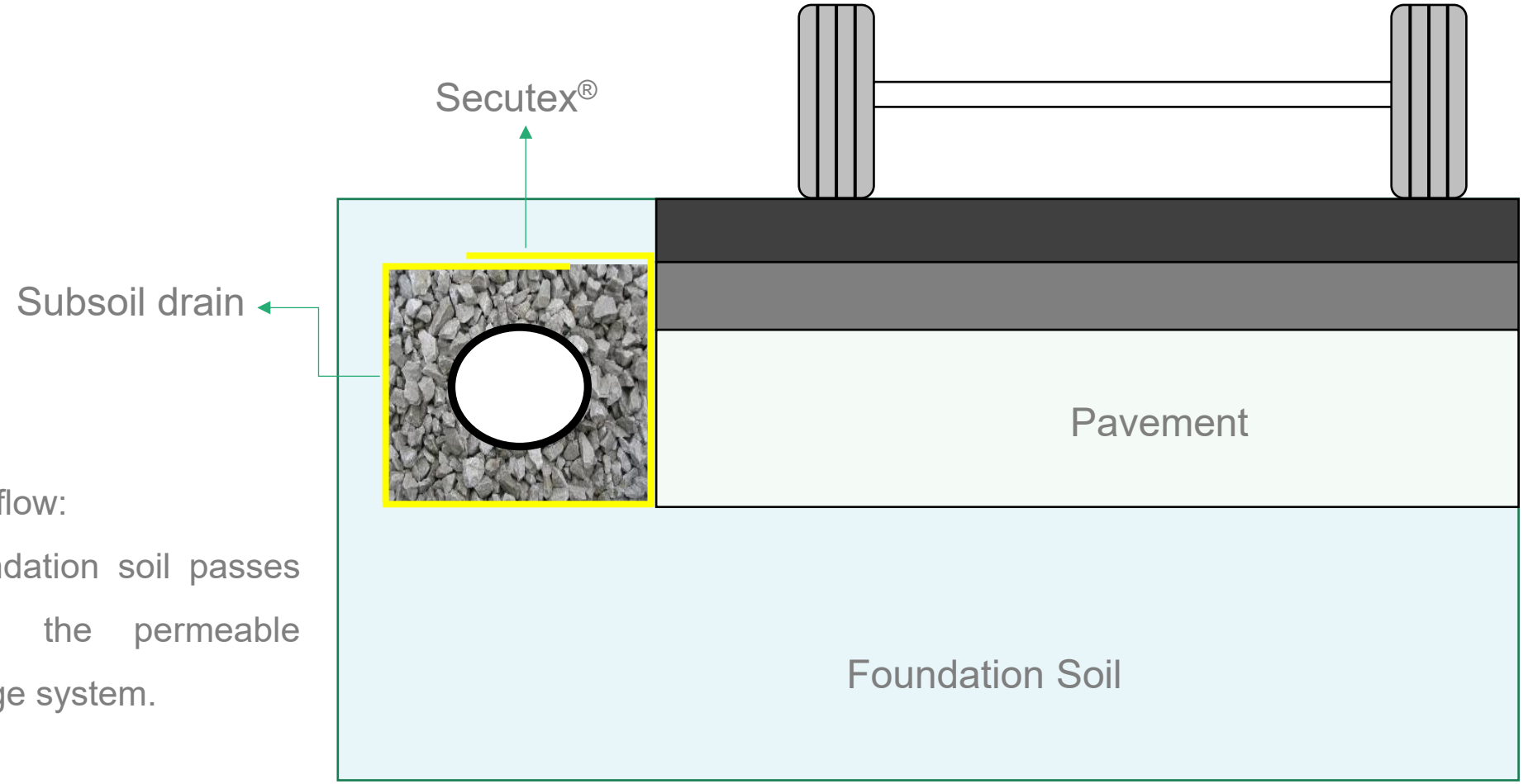
Civil Engineering – Separation / Filtration





- Prevent intermixing of good fill materials and cohesive (bad) subgrade.
- Reduce rutting caused by machineries.

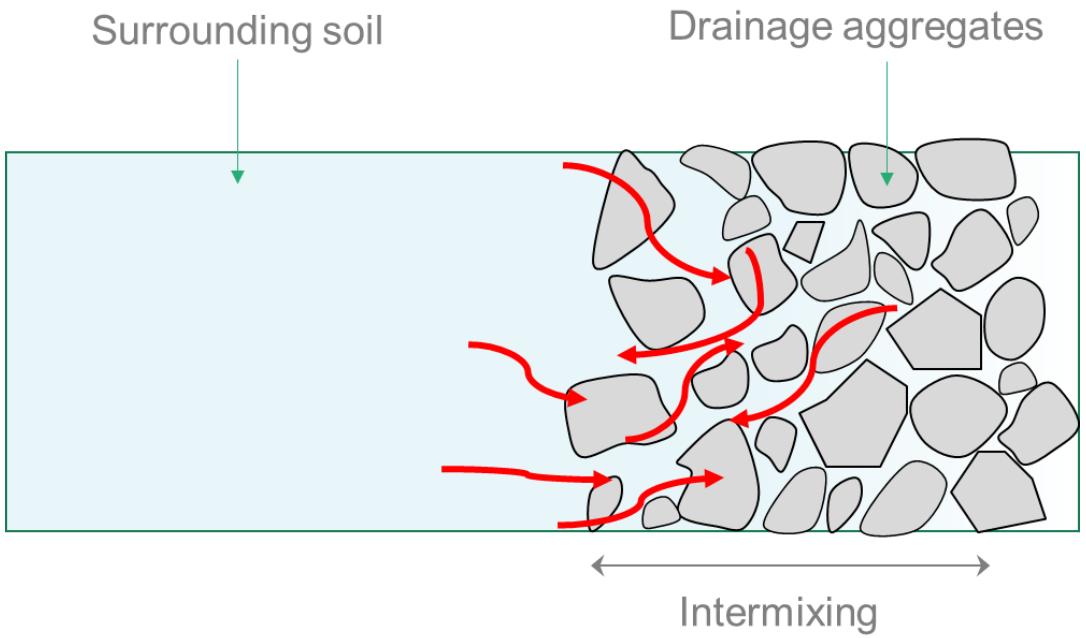
Civil Engineering – Drainage

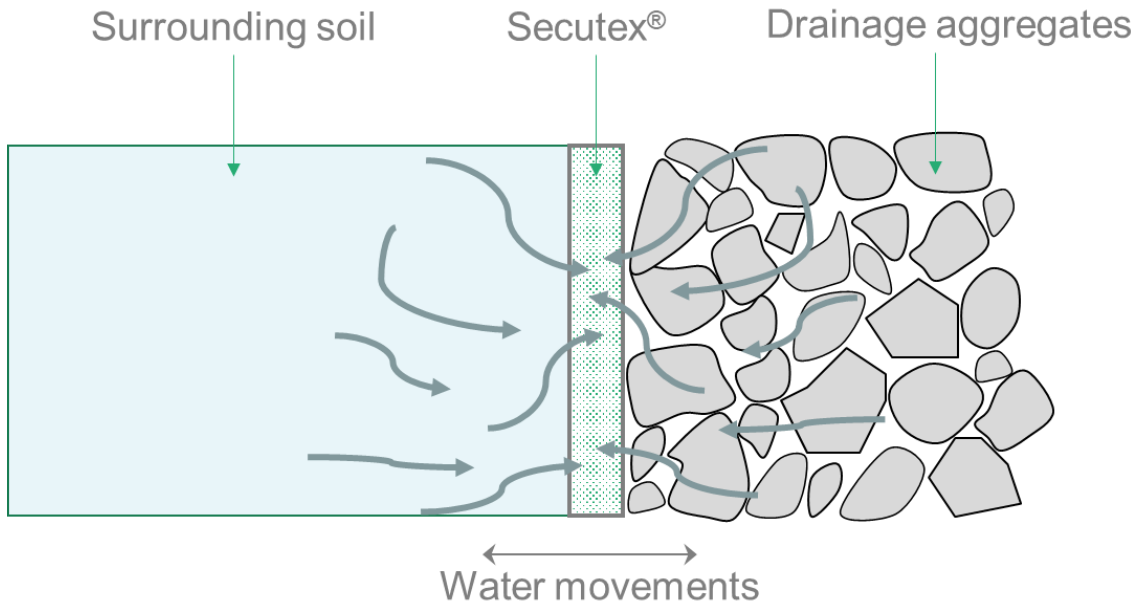


- Allows free water flow:

Water from the foundation soil passes seamlessly through the permeable fabric into the drainage system.

Civil Engineering – Drainage / Filtration





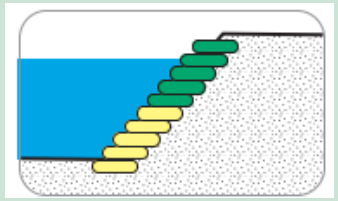
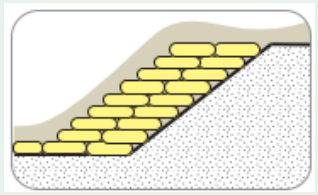
- Reduced drainage capacity.
- Applicable for slope protection when using Gabion.

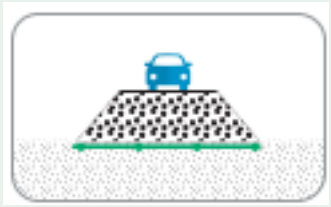
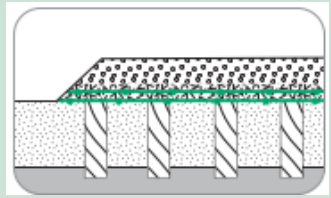
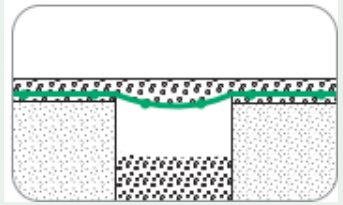
- Facilitate water movement without excessive intermix of separated materials.
- Reduce clogging from fines to the drainage aggregates.

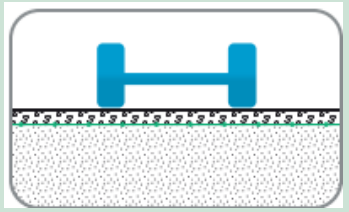
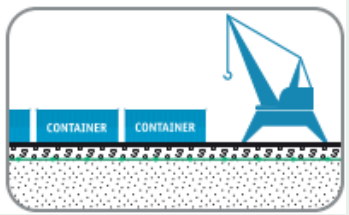
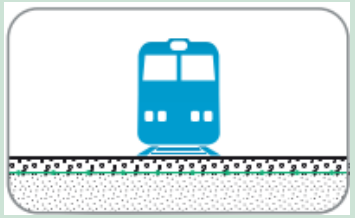
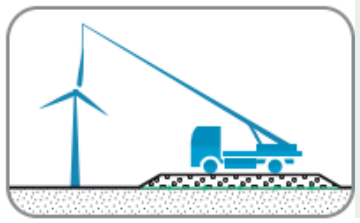
KDR Myanmar
Geosynthetic Solutions Provider

Naue

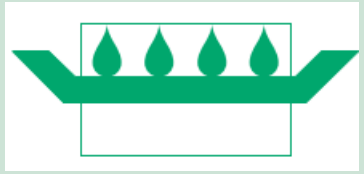
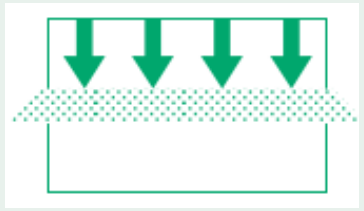
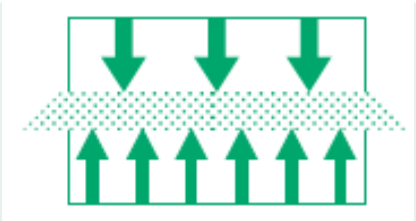
How to Select the Right Geosynthetic

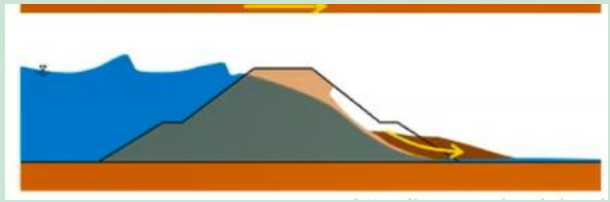
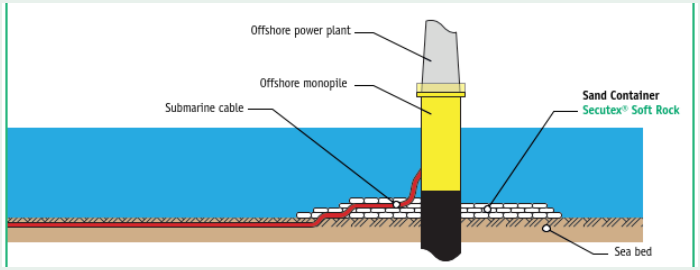
	Application	Product
	Erosion/Riverbank protection	• Non-woven geotextile: Secutex® • Sandbags: Soft Rock®
	Coastal and dune protection	• Non-woven geotextile: Secutex® • Sandbags: Soft Rock®
	Scour protection	• Sandbags: Soft Rock®
	Base Course Stabilization & Reinforcement	• Geogrid: Secugrid® • Geogrid + Separator: Combigrid®

	Application	Product
	Wall and slopes	• Sandbag: Soft Rock® • Geogrid: Secugrid®
	Embankment on soft soil	• Geogrid + Separator: Combigrid®
	Load transfer platform over piles	• Geogrid: Secugrid® • Geogrid + Separator: Combigrid®
	Bridging of sinkholes and mining voids	• Geogrid: Secugrid® • Geogrid + Separator: Combigrid®

	Application	Product
	Unpaved Roads	• Geogrid: Secugrid® • Geogrid + Separator: Combigrid®
	Paved Roads & Storage Yards	• Geogrid: Secugrid® • Geogrid + Separator: Combigrid®
	Railway Construction	• Geogrid: Secugrid® • Geogrid + Separator: Combigrid®
	Working Platforms	• Geogrid: Secugrid® • Geogrid + Separator: Combigrid®

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	Application	Product
	Sealing	• Geosynthetic Clay Liner (GCL) Bentofix® • Geomembrane: Carbofol®
	Protection	• Geosynthetic Clay Liner (GCL) Bentofix® • Geomembrane: Carbofol®
	Drainage	• Non-woven geotextile: Secutex®
	Separation	• Non-woven geotextile: Secutex®

	Application	Product
	Filtration	• Non-woven geotextile: Secutex®®
	Erosion Control	• Non-woven geotextile: Secutex® • Erosion Control Mat: Secumat®
	Seepage control through embankment	• Geosynthetic Clay Liner (GCL) Bentofix®
	Hydraulic Structure scour protection	• Sandbags: Soft Rock®

KDR Myanmar
Geosynthetic Solutions Provider

Naue

Case Studies

Gardens by The Bay, Singapore

Key Points:

- Green walls that provide high factor safety & long term support
- 7m slope height 45° to 70° slope facing, NAUE WRAP

Application:

- Reinforced Soil Structures

Main products:

- Secugrid® 200 / 40 R6
- Combigrid® 80 / 20 R6 R156





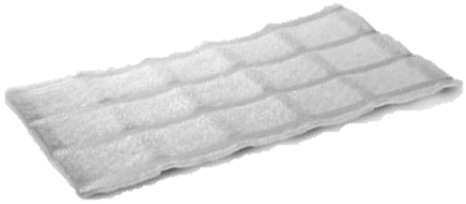


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Challenges with Soft Subgrades

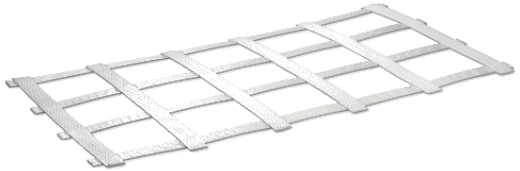
Solution

1. Provide separation, stabilisation & reinforcement
2. Improve load distribution
3. Reduce stress on subgrade
4. Improve bearing capacity



Benefits

1. Reduce / prevent overexcavation
2. Reduce aggregate thickness
3. Prevent loss of aggregate into soft subgrade
4. Reduce construction time
5. Increase service life
6. Reduce overall project costs







Manjung Power Plant, Malaysia

Project brief:

- Ash pond foundation to accommodates coal residue
- In-situ consist of marine clay with c_u around 10kPa
- 2 layers of reinforcement to achieve required FOS 1.3

Main products:

- Combigrid 80/80 Q1

Application:

- Embankment on Soft Soil



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Haulage Depot, Pulau Indah, Malaysia

Key Points:

- Construction of haulage depot & container parking area within industrial park.
- Low SPT N values (SPT N< 4) up to 28 to 30m below ground level.
- High ground water level & temporary shoring requirement > excavation not ideal.

Main products:

- Secugrid® 40 / 40 Q1

Application:

- Soft ground stabilisation & reinforcement



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Srinakarin – Romklao Road, Thailand

Key Points:

- Increase bearing capacity and global stability of the road embankment
- Staged construction to allows some time for consolidation
- Preloading was implemented to reduce the overall consolidation time.

Main products:

- Secugrid® 120 / 40 R6

Application:

- Basal Reinforced Embankment



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Adaro Hauling Road, Indonesia

Key Points:

- Base course reinforcement to provide longer service life of the road
- Trial was conducted back in 2017 with reinforced and unreinforced section
- In-situ soil CBR of 3%, 1 layer reinforcement + 500mm aggregates

Main products:

- Combigrid® 30 / 30 Q1 GRK 4 C

Application:

- Unpaved Road



Access Road Stabilisation, Palm Oil Sarawak





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Access Road Stabilisation, Palm Oil Sarawak





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Jalan Batang Lawas, Sarawak



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Jalan Teratai, Pekan, Pahang, Malaysia





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Roads on weak subgrades

Paved road test section, Bannockburn Road, Logan City Council, Australia (2018)

Installation


Geocomposite installation-Subgrade

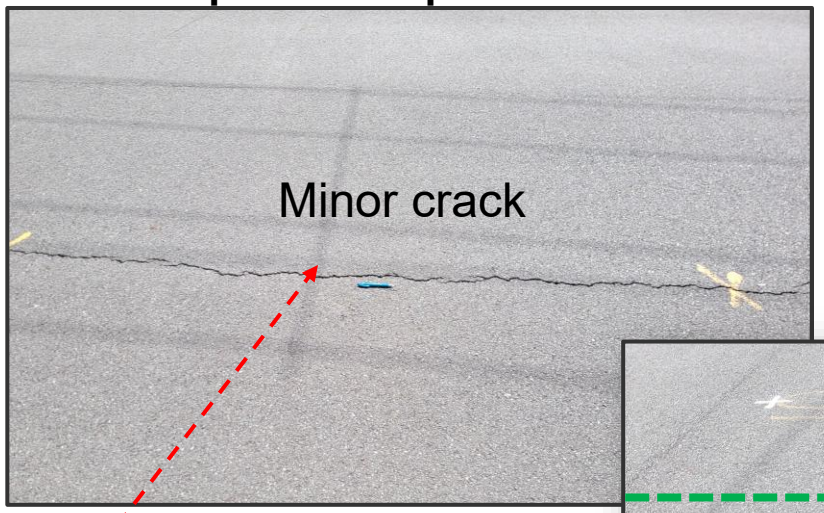

Geogrid (subbase/base interface) and aggregate placement

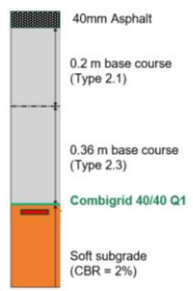

Aggregate Placement and Compaction

Roads on weak subgrades

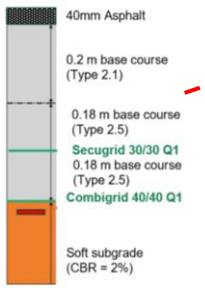
Paved road test section, Bannockburn Road, Logan City Council, Australia (2018)

Visual inspection of pavement surface after 5 years

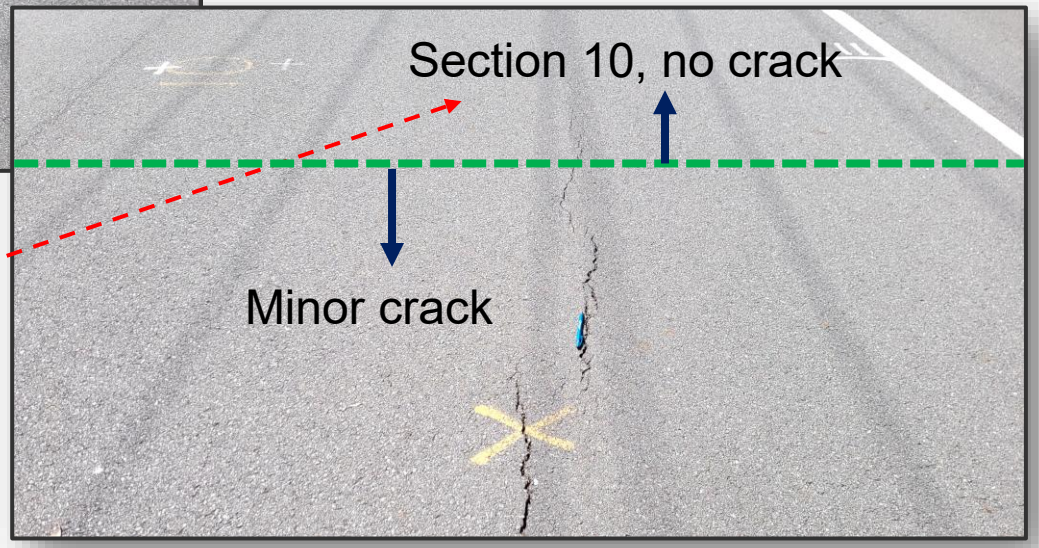




Section #9



Section #10





Section with no geogrid
Major crack

EAST COAST COASTAL REVETMENT, SINGAPORE

Key Points:

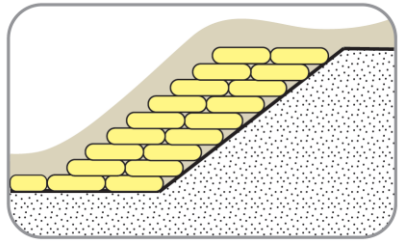
- Singapore response for climate change impact
- Project consists of 3 phases, from 2020 and continued in 2021
- Secutex® Soft Rock RS1201 designed for long-term UV exposure

Main products:

- Secutex® Soft Rock RS1201

Application:

- Coastal Protection





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HUA DIN DAM WEIR, THAILAND

Key Points:

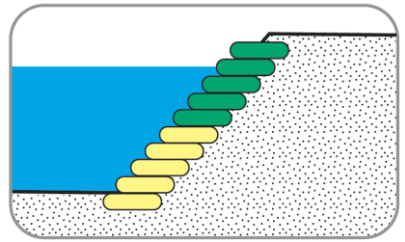
- Located in Bueng Kan City, northern region of Thailand
- Prevent erosion at the slope of the weir
- Cost benefit in transport compared to rock armour

Main products:

- Secutex® Soft Rock RS801a

Application:

- Riverbank Protection





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PKNS GOLF CLUB, MALAYSIA







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SG. DAMANSARA, MYS

Key Points:

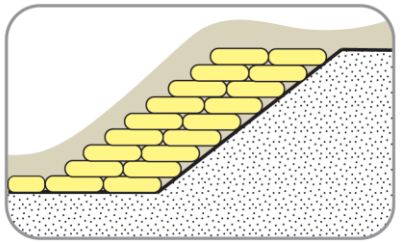
- Riverbank protection with slope steeper than 45^0
- Using Secugrid® geogrid as reinforcing element for slope stabilization
- A total of 70.000 pcs of Secutex® Soft Rock were used in this project

Main products:

Secutex® Soft Rock R601

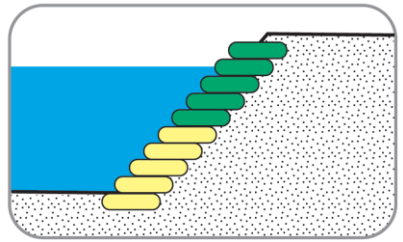
Application:

- Riverbank Protection









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Bukit Tagar Sanitary Landfill, Selangor, Malaysia

Key Points:

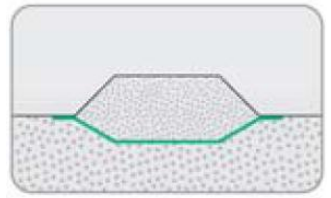
- 700 acres engineered landfill (one of the biggest sanitary landfill is S.E.A)
- GCL line used underlying geomembrane at critical areas
- Bentofix® chosen due to its self-healing capacity & low hydraulic cond.

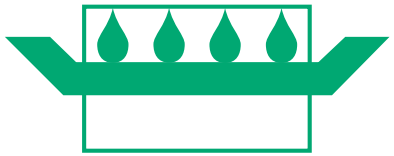
Main products:

Bentofix® NSP 4000

Application:

- Landfill – Base Liner





Sealing



Technical Support & Engineering Services

Naue Asia combines German geosynthetics expertise with Malaysian manufacturing to deliver reliable, sustainable solutions for Asia's infrastructure need

We offer the following technical supports to customers:

- Design proposals, site-specific calculations & indicative quantity estimates.
- Product information, specifications & technical drawings.
- Installation guidelines, in-field trials & supervision.

Naue Portal provides free access to our in-house design software, developed to support engineers and designers using our products and solutions.

- The software is built to comply with international standards and guidelines.
- Covers a wide range of applications



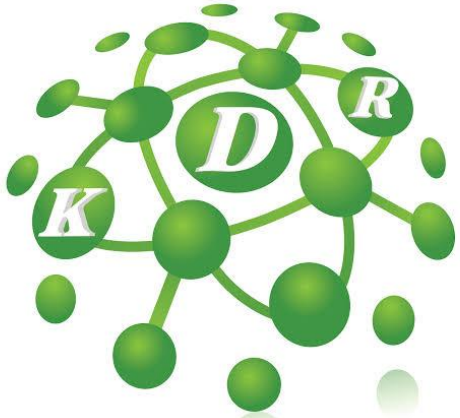
Any questions, please do not hesitate to contact us:

Ir. Nur Saleehah Raeza MN

Technical Manager

Naue Asia Sdn. Bhd.

Email: saleehah@naue.com
asia@naue.com



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KDR Myanmar
Geosynthetic Solutions Provider

Thank You.

Building on sustainable ground.