Geokompsite GeoQiube

OBR PR S.A.

TABOSS GEOKRATA

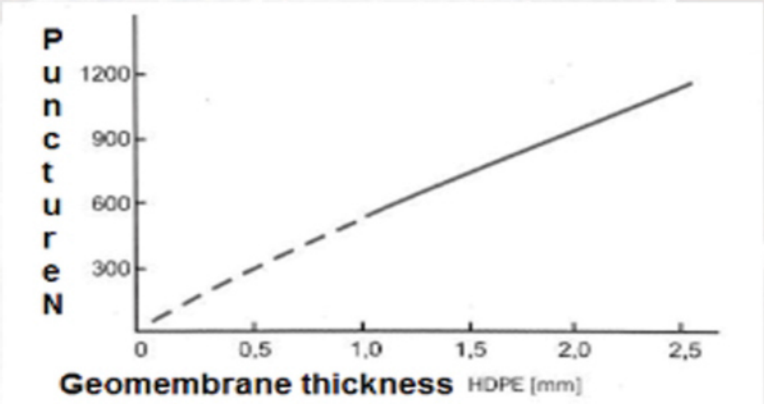
System GeoQiube is an innovational anti-erosion protection of slopes sealed by geomembrane, developed based on the cooperation of two Polish companies:

- Geo-cell producer Taboss
- Geomembrane manufacturer OBR Płock

GeoQiube system solves the problem of combining geo-cell with geomembrane without compromising integrity of the structure . Innovation system is on use of the chicane geomembrane. Chicanes are matched ribbons on both sides of the surface of the geomembrane, sized and spaced to fit cell size.
Ribbons are provided with holes for fixing the hexagonal geogrid, eliminating the phenomenon of point stress concentration in the cells.
Thanks to such solution we get the structure where loads are measurable and which balances the forces maintaining, sliding without disturbance the surface leak proofness and eliminating the needs for pins usage.

Parameters of geomembrane with chicanes

Geomembrane Geochron HDPE Thickness(mm)	Maximum force PN			Chicane lay-out
	Chicanes – shearing force	Chicanes – tear strength	Geomembrane strength	For chicane length 66 cm.
1,0	1,70 kN	1,33 kN	22 kN/m	•Horizontal •Vertical looping every 1,0m
1,5	2,71 kN	2,15 kN	35 kN/m	
2,0	3,50 kN	2,80 kN	50 kN/m	



Puncture test results of HDPE Geomembrane

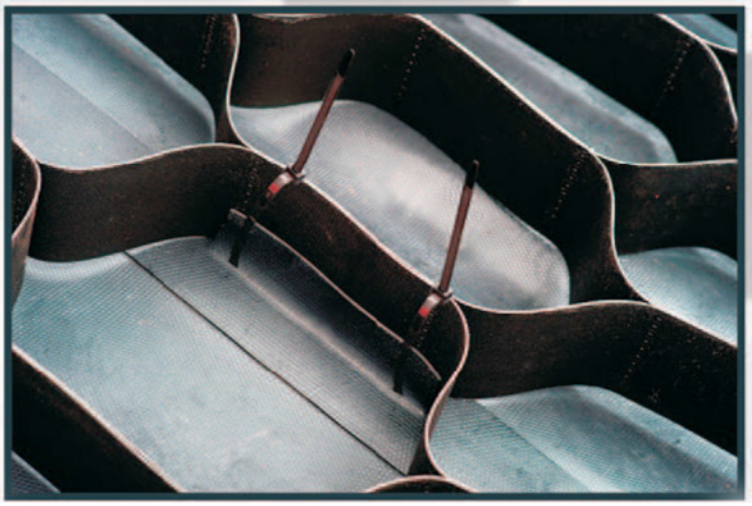
Parameters of geogrid made by Taboss Quibe

No	c	units	value	methodology
1	width of tape	mm	100 -250	by rule
2	tensile strength	kN/m	15,00	PN-EN 10319
3	shearing force	kN/m	22,00	PN-EN 10321
4	breaking strength	kN/m	21,00	PN-EN 10321

By combining sections Qiube by ties with strengths comparable to the strength of the tape cells we get a double effect:

- the weakest link is being eliminated
- inhibition of whole sections slide

along the escarpment.
To achieve the optimum endurance and durability and the effect of semi-rigid panel, the individual cells of adjacent sections Qiube to be combined ties of the recommended strength in the table.

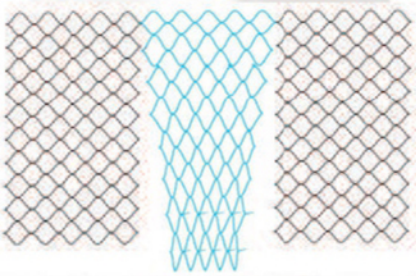


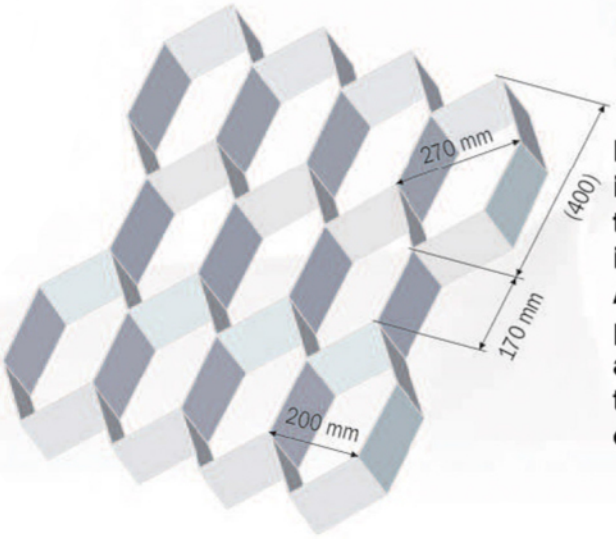
1	**Strength of semi-rigid joint panels**	N	655 ÷ 700	685 ÷ 770	860 ÷ 900	1250 ÷ 1310	PN-EN 5146
		Height	100 mm → 250 mm				
2	**Durability – to cover not later than one month after installation.Predictable shelf life of at least 25 years in natural soils 4 <pH <9 and soils at a temperature of 25 degrees Celsius on the basis of sustainability according to studies of microbical resistance**						
	$f_a = (H \cdot \gamma)\ (1{,}5 \sin\beta - \cos\beta \cdot tg\Phi)$						

H - backfill layer thickness
γ - volume weight of backfill layer
β - angle of scope
ϕ - approach angle between the aggregate backfill and geomembrane

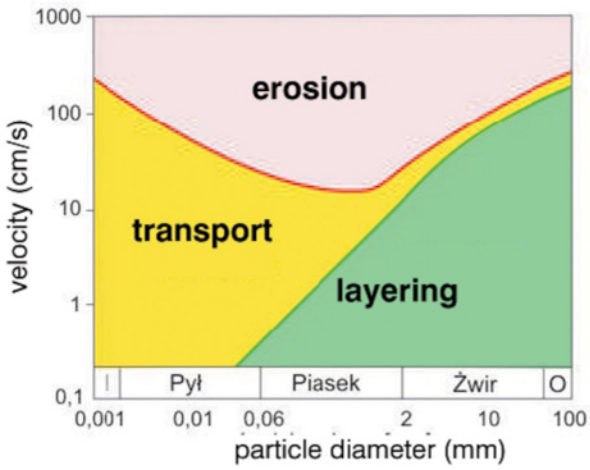
Examples of non-approved bands of the required strength

Example of flow of surface wrongly installed geogrid

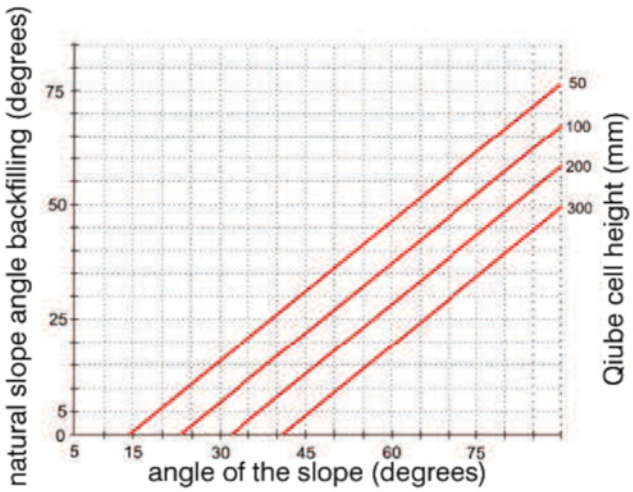




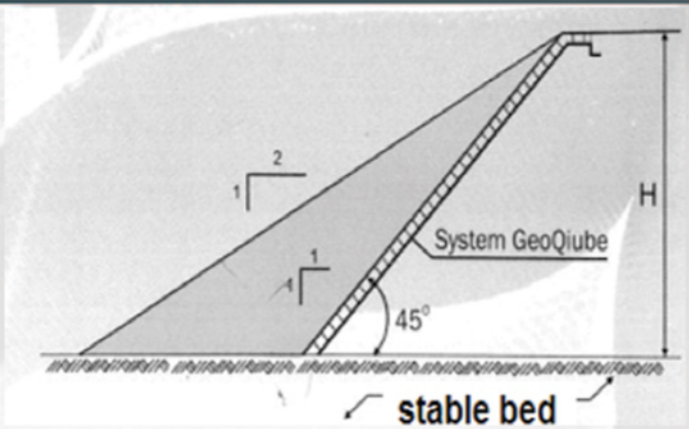
In the anti-erosion layer stability calculations we must take into account the strength of the film, excellent adhesion to the bed, the strength of connections mattress with chicanes in co-operation with the filling material and stiffness of cells. An important advantage of the system GeoQuibe in anti-erosion protection of water reservoir and watercourses, ditches and streams is to protect the slopes and beds against the influence of waves of the water and protection against outwashing of grains and particles.



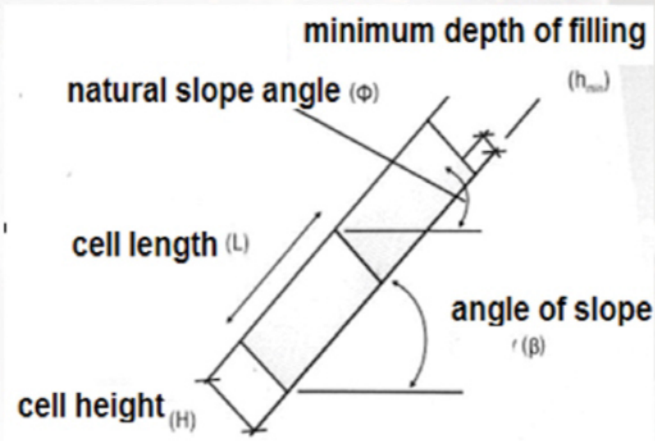
Erosion as a function of flow velocity and diameter of the grains on the surfaces of the system GeoQiube

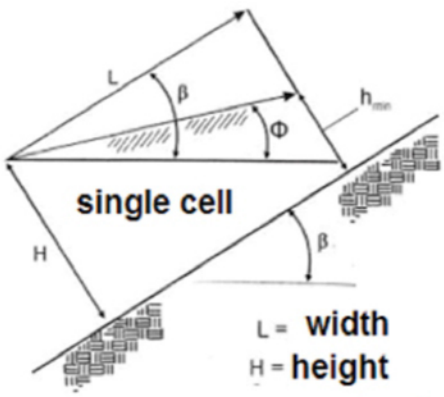


Dependence of the angle of the slope in terms of the Qiube cell size and the type of backfill



The possibility of increasing the capacity of sealed containers or maintain backfill on steep slopes using GeoQiube





L = width
H = height
β = angle of slope
Φ = natural slope angle

Calculation of minimum anchoring force of the 1m2 the geo-cell mattress with a safety factor Fs = 1.5 can be carried out according to the formula

$$f_a = (H \cdot \gamma) \ (1{,}5 \sin\beta - \cos\beta \cdot \operatorname{tg}\Phi)$$

Ø - approach angle between the aggregate backfill and geomembrane *

(*)in the case of de-icing process and hydration backfilling value and should be halved.

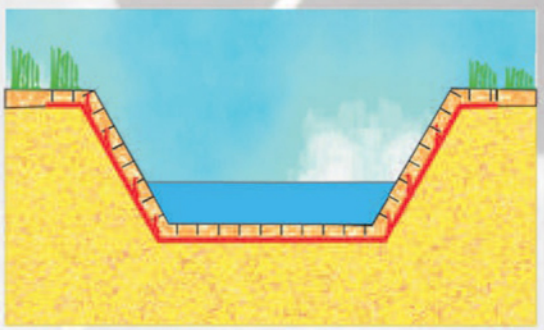
Total anchoring force

$$F_a = f_a \cdot L$$

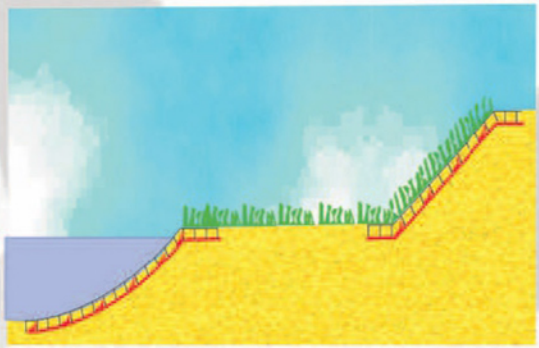
L - length of the slope protection

Application

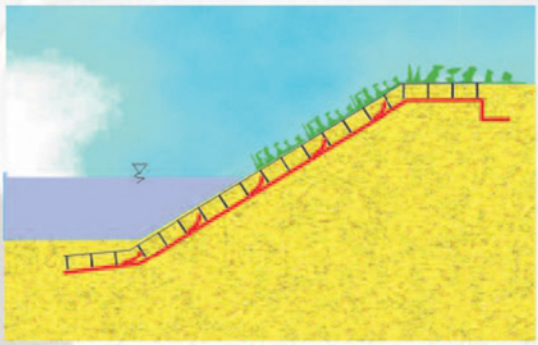
drains



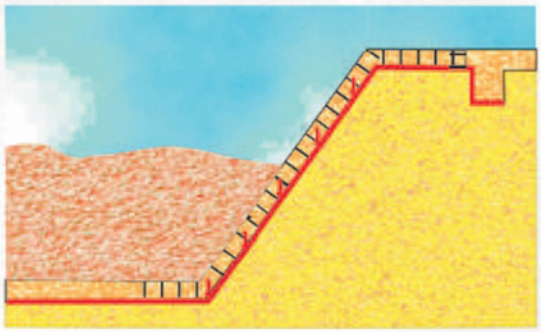
rivers, watercourses,streams



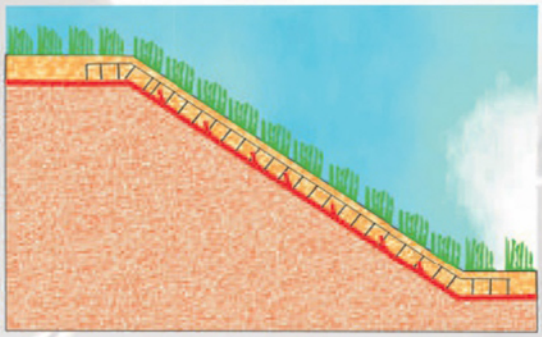
polders



embankments,dams



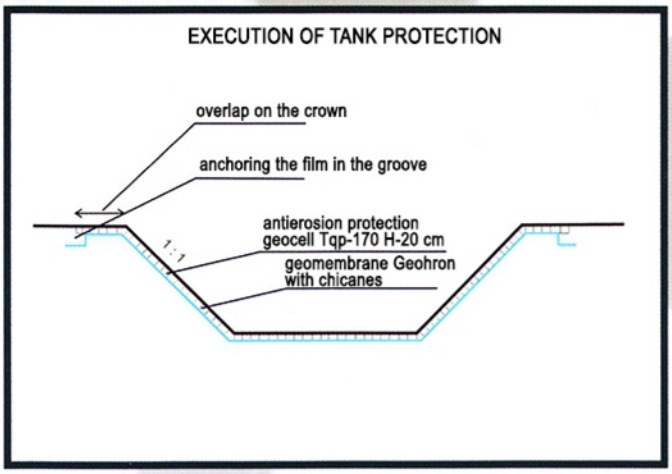
slopes of landfills and dumps



rehabilitation of landfills and dumps

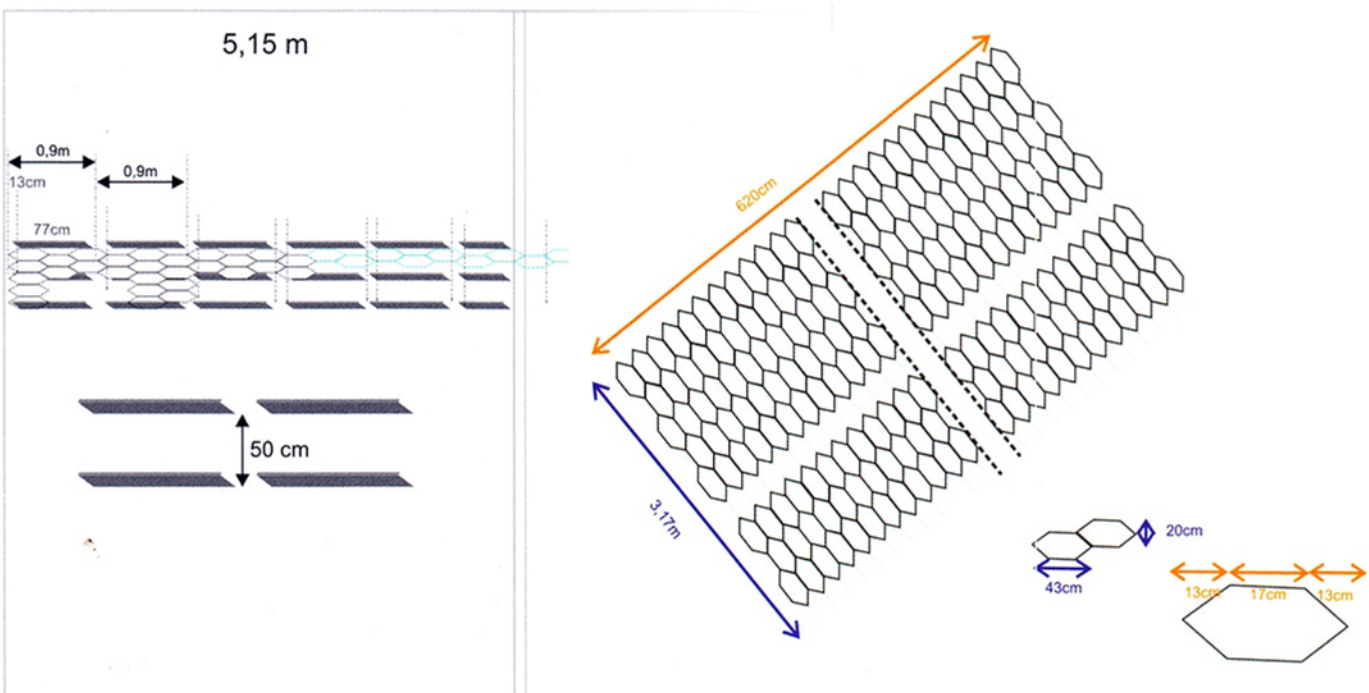
Our companies have a deep experience and as the only over the years have introduced innovative solutions could be confirmed by following patents

- **The spatial connection system - Pat: 393574**
- **Stabilization agent of the surface layer - Industrial design: 121139**
- **Stabilising Foil - Model: 20680**
- **Geocomposite component to support vegetation - Patent PL 211198**



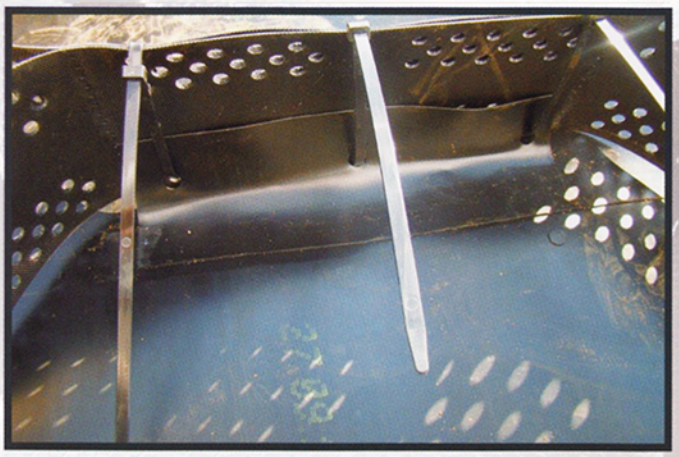
Example of use of the system geoqiube to construction of the fire water tank in Bielsko-Biala.

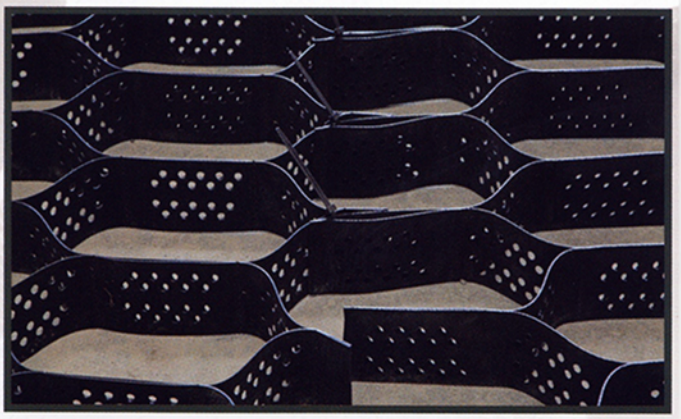
The project uses the seal tank geo-membrane with chicanes of 1.5 mm thick and geocell qiube height 20cm. There is provided a stability gravel filling material on the steep escarpments (1:1) give a unique aesthetic the object and eliminating the concrete cover.



GeoQiube advantages:

- permanent and secure join geo-cell with geomembrane
- can be installed on a slope without the anchor trench
- can be installed safely under water
- strengthening and base isolation
- harmless to the environment
- effective stabilization of biological layer on geomembrane even with a wide gradient of slopes
- increased capacity of an object by the increase the inclination of slopes





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