



Special sessions on Geosynthetics, ICID Conference in Marrakech, November 25, 2021



Geosystems for shoreline protection

Presentator: Edwin Zengerink
25 November 2021

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Introduction Edwin Zengerink



Edwin 1965 born in the Netherlands

- * Studied civil engineering higher technical school in Hengelo.
- * Has done several positions at consulting engineer DHV in The Netherlands + several producers of construction materials for the building industrie;
- * Joined TenCate Geosynthetics in 2001 as technical support engineer for Geosynthetic materials
- * Currently busines development manager for TenCate Geosystems in the EMEA area (Europe Middle east and Africa).
- * Responsible for promotion, marketing and development of projects where TenCate Geotube® systems can be applied.

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Geosystems for marine applications

1. What are Geosystems?

Geosystems are sand filled elements made out of woven high strength textiles. The textiles used are special designed for Geosystems with the same strength in both directions.

- * Geobag system;
- * Geotextile tube system;
- * Geocontainer system;

2. Which type of marine applications (civil works)

temporary bunds, breakwater, dike cores, closures small canals, land reclamation,

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Geobag system

- * Volume 2 till 10 m³
- * Fill mechanically
- * Positioning mechanically
- * Closing with ropes or sewing

Applications

- * Small temporary works
- * Closure of breaches



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Geotextile tube system

- * Sausage shape
- * Diameter between 1,6 till 5 m.
- * Fill height between 1 and 2,7 m.
- * Length between 30 till 100 meter
- * Filling hydraulically
- * Unrolling, positioning and fill.

Applications

- * Submerged breakwaters
- * Bund for land reclamation
- * Core of breakwater
- * Temporary dams



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Product: design table for Geotextile tube systems

diameter	circum	height	fill	width max	width base	recommended high strength fabric
D	C	H	F	W	Wb	
m	m	m	m ³ /m ¹	m	m	
1,60	5,0	1,0	1,7	2,0	1,7	GT 750 M
2,50	7,9	1,5	4,1	3,2	2,7	GT 750 M
3,25	10,2	2,0	6,9	4,2	3,5	GT 1000 M
4,00	12,6	2,4	10,4	5,1	4,3	GT 1000 M
5,00	15,7	2,7	14,9	6,4	5,5	GT 1000 M

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Geocontainer system

- * Installation with split hopper barge on deep water >3m.
- * Volume between 100 till 600 m³
- * Fill mechanically + hydraulically;
- * Positioning with the barge;

Application:

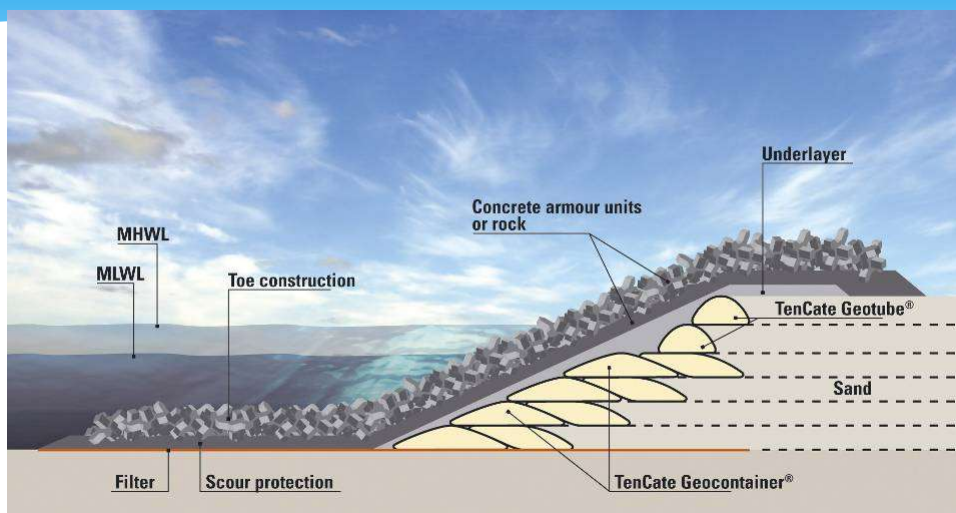
- * Foreshore
- * Dams on deep water
- * Submerged breakwater.



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Possible application



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Benefits

- * No special equipment required for installation;
- * Make use of local available soils/sand;
- * Large experience on projects;
- * Tailor made solution;
- * Cost effective in compare with traditional materials, rock!
- * Build steep slope with sand under water, 1:3;
- * Environmental friendly, low Carbon footprint.
- * Innovative construction methodology in a traditional environment.

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Base material for Geosystems

3 type of products:

- * GT 750 M
- * GT 1000 M
- * GT 1000 MB

Benefits;


- * Natural looking, sand color;
- * High UV stability;
- * Long life additives for marine application;
- * Robust material.



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The use of Geosystems in Coastline protection in Algeria



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The use of Geosystems in Coastline protection in Algeria



Project location
Azzefoun, Algeria

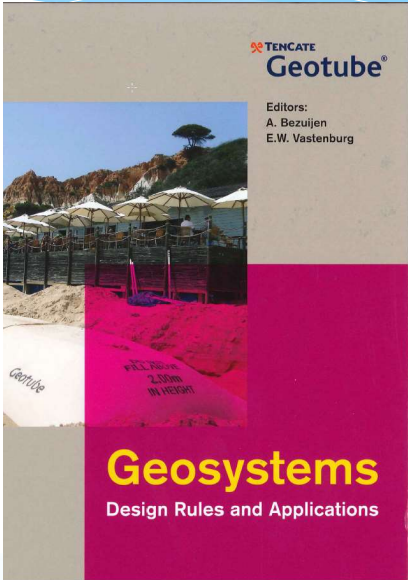
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The use of Geosystems in Coastline protection in Algeria

Design with geosystems
Booklet “Geosystems Design rules and applications”

Available CRC press: Taylor & Francis Groupe

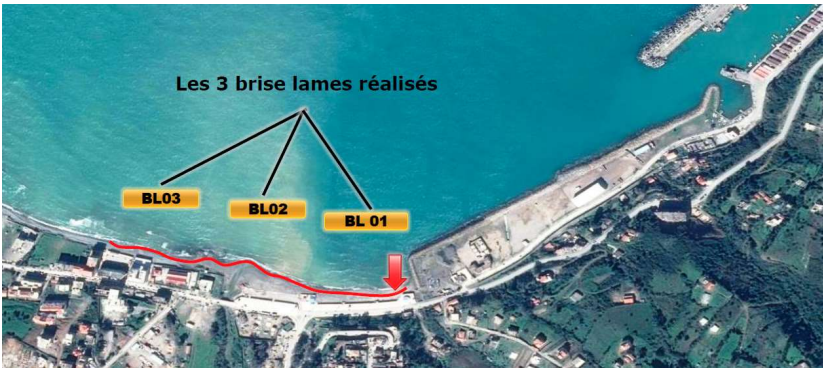


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Breakwater Design in Azzefoun made by the Laboratoire d'Etude Maritime



3 submerged breakwaters

- 2 length 120 meter;
- 1 length 100 meter.

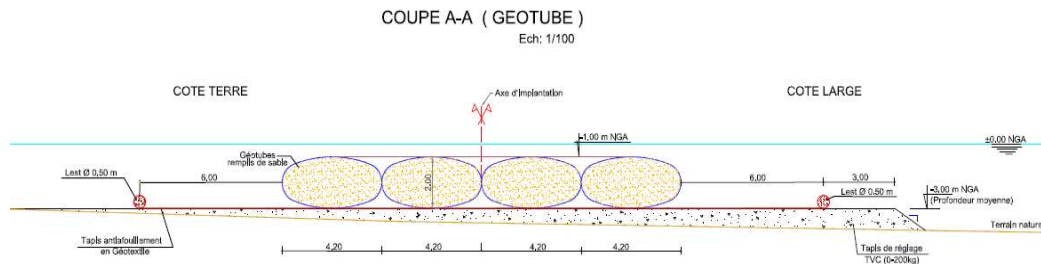
Courtesy HMI Alger

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The use of Geosystems in Coastline protection in Algeria

Cross section breakwater



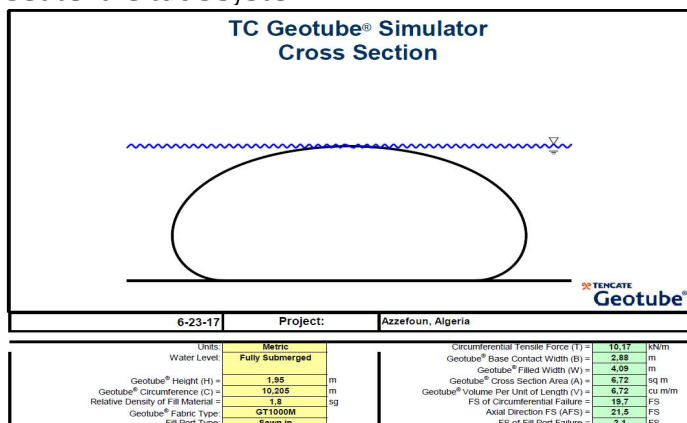
Bottom scour mattras GT 600M fabric with anchor tube, width around 25 meter;
 4 geotextile tube systems diameter 3,25 meter

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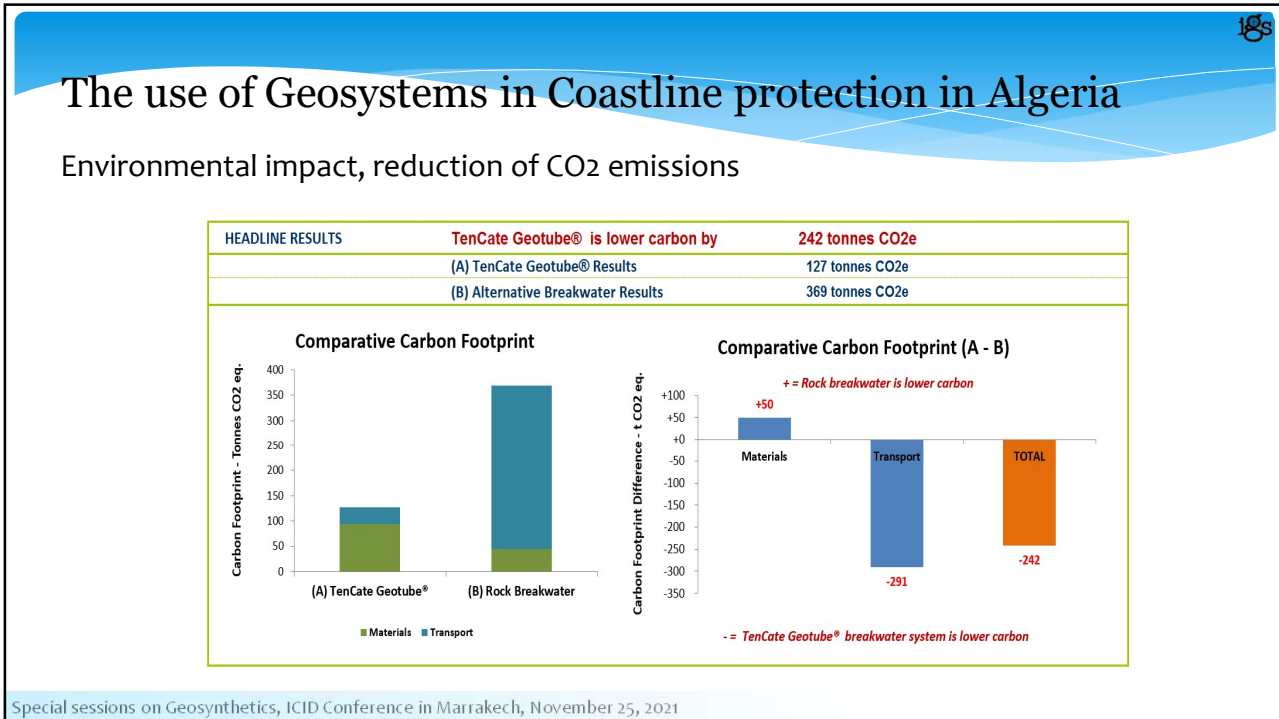
Cross section Geotextile tube system



System, had a length between 40 till 55 meter, produced from a woven with internally a non-woven. Non woven was necessary due to the filter rule calculation

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Project Execution, started in 2011, total time around 6 months.



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Wave breaking on the structure



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Conclusion:

- Coastal erosion can be controlled with local available materials
- Geosystems are environmental friendly solutions
- Wave impact on the coast can be reduced
- No special equipment necessary for the installation



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Thank You For Your Attention!



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