G & E ENGINEERING Since 1984

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In this issue:

We Customize Silt Curtain System

Take a look at the come about of silt curtain which has been deployed for marine construction since the early 90's as measures to confine turbidity. It was quite primitive in those days, until the emergence of the Japanese engineered system at Penny's Bay in 2001. However, contractors found Taiyo Kogyo pricy for temporary measures, good but not competitive in winning bids.

With a similar concept, local fabrication from geotextile became a popular alternative from 2005, but effectiveness is compromised, and performance is uncertain. Around the same time, attention was turned to Korean's products which resembles the Nippon but less costly. Since then, local made are generally used for coastal protection whereas sophisticated imports are used in open seas

Under these circumstances, we are cooperating with the Korean manufacturer to develop our silt curtain to suit local prerequisite, and hopefully cheaper. There will be a wider choice of fabric (to filter fines), curtain reinforcement (to strengthen the fabric), structural component (to withstand current, wind and wave), ballast (to maintain enclosure), connection fittings (to keep system integrity), fluke anchors (to replace concrete block) and accessories (marker buoy and sub float). The system can be comprehensive, to offer long term durability or very basic to meet short term limited budget.

Typical fabrication with standard Bontec SG110/110 (NE/2015/02)

Here are some of the projects we take inspiration to bring about the customized silt curtain. Coming installations are a double ballast system at Lago Nam Van in Macau and a short span at Sai Sha Road to fit the site constrain. Talk to us when silt curtain fabrication is sought, info@g-and-e.com.

A high strength reinforced woven geotextile that can be attached to barge, retractable by winch (C3204)

Heavy duty Korean tube type that stretches to10 m depth (HY/2012/08)

Hybrid system with Bontec SG110/100 bolted to DSP tube type (HKHA20120023)

Standard Korean tube type silt curtain (HK/2009/02)

Hybrid system attached to work flatform (NE/2015/01 & NE/2017/01)

Fabrication from Bontec SG110/110 geotextile (CV/2012/05)

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New Product / Application

Dustex

Dustex is a calcium lignosuphonate based natural polymer derived from wood that is a superb binder of dust. It offers excellent dust suppression in construction site and unpaved road by consolidating surface soil to form a crusty layer, thus reducing fine particle to be blown away. The material is non-toxic, easy to spray and cost effective by reducing the frequency of constant watering.

Sample available for trial

Dustex is made in South Africa and comes in powder in bulk 600 kg bag or 25 kg water soluble wrap. Once diluted to dosage, Dustex can simply be sprayed. Depending on the site and road condition, weather and traffic volume, rejuvenation may be necessary over a long period. Talk to Gary at gary@g-and-e.com for details.

Technical Note

Interpretation of Permeability of Geotextile

Geotextile is commonly used in filtration and separation. The capability of allowing water to pass through while fines are retained has been represented by various terminologies, often in confusing technical term, in plain English or in layman's term. Here is an attempt to clarify the proper interpretation in engineering language in accordance to the Geosynthetics Research Institute, USA.

Demonstration of water flow through woven / non-woven geotextile with various thickness.
Demonstration of sand retention by geotextile, note that sand layer governs the permeability

1. Capacity of water passing through the cross plane of or normal to the geotextile can be represented by flow rate, permeability and permittivity under ASTM D4491 or ISO 11058

- **Flow rate (q)** is volume flow through a geotextile per unit time, measured in m^3/sec
- **Permeability (k_n)** or **hydraulic conductivity** is flow rate per unit area (A), expressed in m^3/m^2/sec or m/sec
- **Permittivity (ψ) or permeability coefficient** is flow rate per unit area per head (or hydraulic gradient (i) per thickness (t)), expressed in $m^3/m^2/m$/sec/ or simply sec^{-1} to represent the effect with compressible geotextile under loading

The classic Darcy equation gives the relationship

$$q = k_n\, i\, A = k_n \frac{\Delta h}{t} A \quad or \quad \frac{k_n}{t} = \psi = \frac{q}{\Delta h\, A}$$

2. Capacity of water passing along the plane of geotextile can be represented by flow rate and transmissivity under ASTM D4716 or ISO 12958

Technical Note (Con't)

- **Flow rate (q)** is volume flow through per unit time, in (m^3/sec)
- **Transmissivity (Θ)** is flow rate per hydraulic gradient (i) which is the head loss per length, per cross section width (w), in $m^3/m/m/m$/sec or m^2/sec to represent the in plane flow in related to the inclination
- **Transmissivity (Θ)** is also defined as the in-plane permeability coefficient k_p expressed in m/s to the thickness (t) in m, or m^2/sec

The classic Darcy equation gives the relationship

$$q = k_p\, i\, A = k_p\, i\, (\text{w x t}) \quad \text{or} \quad \Theta = \frac{q}{i\, w} = k_p\, t$$

Opinion Column

A Day with Geotextile, Geogrid, Geomembrane, Geosynthetics

We saw 120 engineers attended the one-day CPD seminar organized by Advanced Technovation Limited on 6 June, an event we supported and sponsored.

While the focus was on technical presentation of design, application and innovation of geosynthetics, both traditional and new material, we managed to set up a small workshop area where participants were able to appreciate the characteristics and performance of various types of geosynthetics samples and modeling.

We took notice that active interaction between speaker and audience, hand on experience with sample, smaller group more intensive discussion can be beneficial to bring forward knowledge. The program was structured with long coffee and lunch break, precisely to foster the intimacy. We hope that the day went by well and this type of interactive seminar can be encouraged. Write to Gary at gary@g-and-e.com for sponsors and training workshop set up at your office.

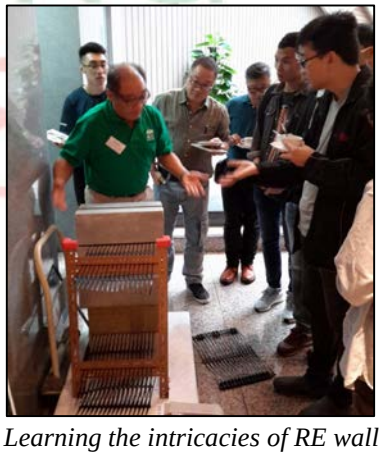
Some speakers from overseas

Kick starting the seminar with the IGS sustainable geosynthetic video

Geotextile permeability demonstration

Various workshop station to supplement technical presentations

Discussion with prototype sample



Learning the intricacies of RE wall with geogrid using real model

For Your Information

Silt Curtain at Tai O Stilt House

We are a great supporter of corporate social responsibility and took part in World Wide Fund for Nature Hong Kong "ALL HANDS on DECK", a project that engages various local communities in Hong Kong to bring awareness of ocean littering.

At the Tai O fishing village, we designed and installed a refuse boom that keeps debris from drifting to the traditional stilt houses where hygiene becomes unmanageable. Hopefully, the interception of debris will remind the public the importance not to pollute our ocean.

A total of 3 spans of silt curtain 60 m long x 1 m depth was fabricated in Korea and were placed on 16 May, a lunar low tide day. The barrier floats with the tidal and is anchored to an assigned alignment, collecting rubbish for removal before it gets under the stilt houses or the shoreline. A cleaning campaign was put forward to clear existing debris prior to the installation. It is working quite well and the performance is continuously monitored by CCTV. For details, reach Stanley at stanley@g-and-e.com has more.

Fencing off the Stilt house

Installation of the refuse boom

In operation at high tide

Completion at low tide

Reader's Response

Let us hear from you. Write to us at newsletter@g-and-e.com. For back issue, please write to nannette@g-and-e.com or visit our website at www.g-and-e.com.

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