

G and E Times

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Polymeric Geogrid for Reinforced Fill Construction – A Recap 14 Years after Completion

Back in 1998 reinforced fill construction was not well known to engineer, let alone the use of polymeric geogrid. Nevertheless, the technique was adopted to construct a 70° slope at Chi Nin Nunnery in Diamond Hill. It was necessary to maximize garden space, which was the main theme of the development. The steep filled slope creates an enlarged resting area.

The slope is 8 m high by 60 m length, using soil bag and erosion mat (soil was filled into the matrix) for the face, to provide a growth medium for vegetation. Tenax's HDPE geogrid was used for the Reinforced fill slope. Design follows GEO Reports No. 64, prior to the publication of Geoguide 6. It took a mere 6 weeks to complete the work. Since expiry of DLP, few visits were

paid to ascertain the overall and surface stability. At the last visit in 2007, no serviceability problem was observed and heavy vegetation and trees had virtually taken over the original hydroseeding species.

The site was revisited again on 60th June, 2016, courtesy of the Chi Lin Nunnery management. The integrity stays the same after 14 years. There was little deviation to the slope profile, geogrid levels were as constructed, and no deterioration of geogrid was observed. The vegetation blends in well with the environment and the natural appearance masked any manmade characteristics. 🌴



Geogrid at the facing stays intact after 14 years of exposure



Under construction, Sep 1999



Well maintained vegetation, May 2013



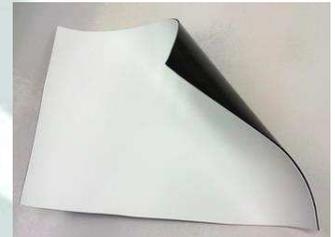
Heavy vegetation, Jan 2007

New Product / Application

Innovative Waterproofing Membrane Installation Quality Control

In the last 20 years of our HDPE waterproofing membrane installation, integrity commissioning is monitored and warranty by a control quality assurance (CQA) program. This includes visual inspection, destructive and non-destructive testing of the membrane and the seaming. The next phase of work on the membrane (ballasting, screed, ponding etc.) can potentially cause damages. A new conductive membrane can be spark tested by scanning probe to detect any small puncture over the entire membrane surface, post installation, before and after cover.

GSE has developed a high performance conductive membrane with a co-extruded, electrically conductive bottom layer. An electric circuit can be completed by the application of a scanner if there is any membrane penetration. Such defective area on the membrane will automatically be detected and a visible spark from the charged undersurface can be seen and an audible alarm can be set off instantaneously. This spot can then be marked for repair and recorded accordingly. We will be offering this QC option to our client, the scanning of the entire waterproofing area will be incorporated into the waterproofing quality assurance program. 🌴



GSE Conductive membrane

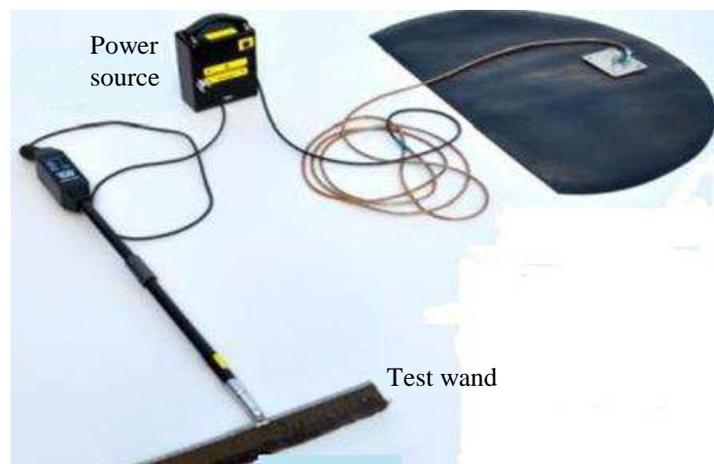


Non-destructive air pressure test



Non-destructive vacuum box test

State of the art
Tinker & Rasor Spark Tester



Power source

Grounding pad

Test wand

Technical Note

Maccaferri Day

A 'Half Day Seminar on Innovative Engineered Solutions for Safe and Cost-efficient Underground Excavation' was held at Clifton, a cozy meeting venue in the heart of Central away from bustling construction site, on 26th May 2016, co-organized by Maccaferri Asia and G and E Co. Ltd.

The event focused on OM tunneling products and solutions. Experts from Maccaferri Asia demonstrated to guests on how they may assist and supply engineered products for mechanized and conventional tunneling, techniques such as steel fiber reinforced concrete for segmental lining, tubular tunnel support, ground consolidation system and GFRP bar.

Feedback from the more than 70 participants was impressive in terms of questions, inquires and requests for follow up. Lively discussions were exchanged over lunch before everyone settled back to their desk in the afternoon. If you are interested to find out more about what was presented, please contact us at wing@g-and-e.com. 🌴

Right: demo P.E.R. ground system for ground improvement
Bottom: Riccardo Perlo from Maccaferri presenting



Above: Dr Ralf Winterberg and Riccardo Perlo as speakers from Maccaferri

Left: Maccaferri visitors with G and E staff



Opinion Column

Geotextile Overlapping Ambiguity

Geotextile is usually deployed by unrolling and placing. But the joining of various rolls or panels has no particular specific requirement for any specific application, whether by way of overlapping, seaming, welding or adhesion. In general overlapping is called for and the lap length is determined by the subgrade rigidity so that the overlapping will not opened up or fish mouthed when the subgrade settles. 600 mm to 500 mm are arbitrary but exaggerating 2 m has been seen in some specification. Large panels are often preferred to be stitched together by sewing machine with a method of stitching to achieve a desirable seam strength. Heat welding is sometimes taken to prevent localized movement, wrinkle or wind uplifting when backfill is not as fast. Lately, adhesive chemicals and Velcro are available to attach overlapping area, effectively a seamless connection. Whichever method used, overlapping wastage can be monitored, and diligence and carefulness are basic considerations to good workmanship. 🌴



Velcro

Stitching



Welding



Chemical

For Your Information

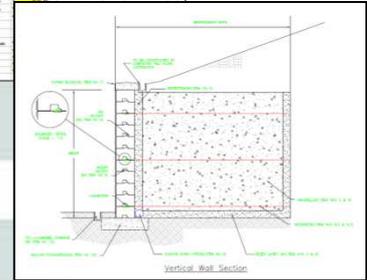
Reinforced Fill Design - a Simple Software on Geogrid Configuration

Since 2007, G and E has been developing a spread sheet to determine geogrid configuration for reinforced fill construction, a conservative internal stability calculation following entirely GEO Geoguide 6 based on the use of Tenax geogrids under GEO Endorsement Certificates RF6/2006 to RF1/2016. Over the years, the software has gained maturity and we are planning to upload the spreadsheet onto our website for your reference. It is intended to be user friendly. For simple geometry and basic soil, you will be able to optimize the type of geogrid, length and spacing of necessary reinforcement. A typical BQ will be generated to estimate cost of construction instantaneously. Stay tune for our coming issue. 🌴

GENERAL INFORMATION AND ASSUMPTIONS		WELL DATA		Soil Parameters	
1	Well Name:				
2	Well Diameter:	1500 mm			
3	Well Depth:	10.00 m			
4	Height of the structure:	1.00 m			
5	Angle of base of structure from vertical:	0°			
6	Unit weight of backfill soil:	18 kN/m ³			
7	Friction angle of backfill soil:	30°			
8	Base Width of backfill soil:	0.70 m			
9	Unit weight of surface soil:	18 kN/m ³			
10	Friction angle of surface soil:	30°			
11	Base Width of surface soil:	0.70 m			
12	cohesion of soil (effective stress condition):	0.00 kPa			
13	cohesion of soil (total stress condition):	0.00 kPa			
14	Water Table (from base of structure):	0.00 m			
15	Water Table (from base of structure):	0.00 m			
16	Unit weight of water:	9.81 kN/m ³			
17	Allowable Soil Bearing Capacity:	100 kPa			
18	Angle of upper face surface from horizontal:	0°			
19	Type of fill material:	Typical			
20	Particle Size of Fill Material:	40 mm			
21	Factorial Size of Fill Material:	0.075			
22	Factorial Size of Fill Material:	0.075			
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50	Factorial Size of Fill Material:	0.075			

Left: Project Parameters & Initial Sizing

Below: Typical drawing of T-Block



Announcement

Next year, G and E will be celebrating its **30th** anniversary. A series of events have been planned to reach this milestone. Do expect to hear more from us on this in the near future. Your participation and support for us is much appreciate. 🌴

Reader's Response

Let us hear from you. Write to us at newsletter@g-and-e.com.

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