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WELCOME

Global Synthetics is a 100% Australian owned company staffed by engineers with extensive experience in geosynthetics in Australian conditions. Large stock supplies are held throughout Australia to service your requirements efficiently.

This newsletter showcases some recent projects with which Global Synthetics has been proud to be associated.

ACEGrid® for tailings dam capping

Senescent mine tailings ponds and dams consist of a partially dewatered slurry that has little or no load-bearing capacity. These geotechnical properties present a challenge for design engineers in the rehabilitation process.

In a recent project, the mine site required a working platform of suitable strength to support earthmoving equipment distributing backfill over the area. With undrained shear strengths of less than 15kPa, a substantial increase in the load capacity was required. The preferred solution was to adopt a nonwoven geotextile and a high-strength geogrid multi-layer. The reason for this approach was simple: the nonwoven PROFAB® geotextile layer provides a separation layer to minimise the pumping of fines and the heaving of the foundation material and the ACEGRID® high-strength geogrid provides a reinforcing layer to increase the tensile capacity of the tailings material, and thereby its load-carrying capacity. ACEGRID® high-strength geogrids can also be fixed together so that the required overlap is maintained. A structural join was not used in this case.

GEOSYNTHETICS IN PAVEMENTS

Upcoming seminar series – November/December 2013

In keeping with our ongoing commitment to providing education to the geosynthetics market, Global Synthetics will be presenting a series of seminars on The Use of Geosynthetics in Paved and Unpaved Roads. Dr Steve Perkins and Mr Jorg Klompmaker will be presenting day long seminars, covering recent research findings, design theory, design examples and design issues.

Dr Steve Perkins is a Professor in Civil Engineering who teaches and conducts research in geotechnical and pavement engineering at Montana State University. Mr Jorg Klompmaker is an engineer specializing in reinforced structures, pavement engineering and waste management design issues. Mr Klompmaker is employed by the German consultancy BBG as a Senior Technical Consultant.

The seminars will be held in:
- Perth November 29
- Brisbane December 2
- Sydney December 4
- Melbourne December 6
- Auckland December 10

An information brochure will be distributed in the coming weeks.

For more information, contact ray@globalsynthetics.com.au or visit our website, www.globalsynthetics.com.au

Tensile strengths up to 1000 kN/m are available in the ACEGRID® range. Furthermore, the high tenacity polyester yarns provide long-term creep resistance and superior long-term design strength.

PROFAB® nonwoven geotextiles are available in up to 6m wide rolls providing faster installation times and less overlap wastage. Coupled with the wide ACEGRID® rolls, this composite solution enabled the mine site to construct a practical, economical and expedient solution for the capping layer.

Reclamation of mine tailings using geosynthetics will enable the reuse of this land in a shorter time than would otherwise be required, which is a favourable outcome for the environment and for local communities.

For more information, contact ray@globalsynthetics.com.au or visit our website, www.globalsynthetics.com.au
The Millar Road Landfill & Recycling Facility is owned & operated by the City of Rockingham in South West, Western Australia. As part of the annual cyclic process of opening and closing the city’s municipal sanitary landfill cells, ‘fields 9, 10 and 11’ required capping to enclose & secure those respective cells using a Geosynthetic Clay Liner (GCL).

During the tender stage, the City of Rockingham assessed two different styles of GCL from two different suppliers. One included a standard composite needle punched GCL which incorporates bentonite powder sandwiched between two layers of geotextile. The second option represents the new generation of ‘multicomponent’ GCLs whereby an additional polyolefin coating is bonded to one side of the GCL. This new style of BENTOFIX® is known as the ‘X’ range.

The BENTOFIX® ‘X2’ NSP4000 was selected for this project due to a variety of inherent performance advantages. The BENTOFIX® ‘X’ is purpose designed for applications where the liner is required to be placed relatively close to the ground surface such as landfill caps and liquid containment structures. Near the ground surface, the low confining stresses over the GCL often necessitate an extra level of security (or factor of safety) over & above the bentonite barrier alone. Special requirements in these environments include the following;

- **increased resistance to desiccation** – once the bentonite is hydrated, the polyolefin coating provides some insurance against rapid bentonite dehydration close to the surface during dry periods (a possible occurrence on landfill caps)
- **decreased permeability** – the ‘X2’ type BENTOFIX® exhibits an ultimate ‘k value’ (hydraulic conductivity) which is significantly lower than uncoated GCLs (10⁻¹⁴ vs 10⁻¹¹ m/s).
- **barrier against ion exchange** – where the GCL might come into contact with leachable cations, the clay structure of the GCL may be adversely affected. The applied polymer ‘X’ coating, when faced against the source of the cation contaminants, can help guard against cation exchange.
- **instant gas barrier** – bentonite hydration can be a slow process and is dependent on local climates and soil characteristics. Typically, you would expect several days to achieve optimum hydration in wet climates and several months in dry conditions. Landfill capping applications may require an immediate barrier to gas permeation. The ‘X’ coating satisfies this function while the porous bentonite core is hydrating.
- **resistance to root penetration** – the ‘X2’ material has been tested and proven to resist root penetration from nearby trees given that the film tends to deflect the immature roots instead of providing pathways for ingress (pores).

The City of Rockingham has a constant need to minimise risk at a manageable cost in landfill environments. This simple policy drove the final decision to install in excess of 70,000m² of BENTOFIX® ‘X2’ NSP 4000. All BENTOFIX® GCLs are manufactured to the strictest quality control requirements with roll traceability an integral part of the MQC process. Installation was successfully executed by Earthtec Constructions on time and on budget.

For more information contact sean@globalsynthetics.com.au

STOP PRESS : Watch out for the next BENTOFIX development - the ’XF’ range. New heavier coatings with embossed, textured surfaces to improve shear interfaces. BENTOFIX – innovation in GCLs.
Shell Cove Boat Harbour is an exciting new development located just 30 minutes south of Wollongong in New South Wales. Once completed, it will include a 20 hectare boat harbour, a marina with 300 floating berths, specialty shops and commercial premises, residential housing and several other community facilities.

The first stage of construction began in early 2013, to transform the swamp into the extensive harbour and marina. Swamps are characterised by very soft ground and present significant challenges for construction. In the initial stages, accessing the site with heavy equipment posed the risk of the equipment sinking into the very soft subgrade foundation.

Earlier this year, Global Synthetics approached the main contractor to discuss possible treatments. Various options were considered with regard to improving the soft ground. Global Synthetics provided advice on the most suitable products and supply requirements, as well as technical assistance and design concepts.

The specifications originally called for a biaxial geogrid known as ‘SS40’ to be used as the pavement reinforcement. A number of geogrid options were offered including biaxial and triaxial types. The geotechnical consultant insisted that a field trial be performed on the various options put forward.

Global Synthetics proposed SECUGRID® 40/40 biaxial geogrid, made from high strength polypropylene that exhibits a very high tensile modulus. The alternatives included a weaker triaxial geogrid known as ‘TX160’.

In the field trial, the three geogrids were laid over a non woven geotextile separation fabric. Granular aggregate was placed over the geogrids to a depth of over 600mm and compacted. A 45T Moxy dump truck was used to traffic the pavement before the area was examined by the consultant. The pavement was assessed for rutting and surface deformation and the geogrids were carefully exhumed to assess how each individual geogrid type had performed.

Pumping of the subgrade was identified in some sections of the pavement, and prominent rutting was apparent in areas where the triaxial geogrid had been placed. Exhumation confirmed that the triaxial geogrid had succumbed to significant installation damage. The lightweight ribs of the triaxial geogrid were observed to have ruptured in a number of places. In sharp contrast, the higher strength biaxial geogrids performed well and suffered little to no damage.

This problem of installation damage has been tested and verified by ERA Technology Ltd showing that the TX160 triaxial geogrid performs poorly in regard to the amount of installation damage sustained when compared with that of the SECUGRID® geogrid. A copy of these test results is available on request.

The SECUGRID® 40/40 performed well and was subsequently approved and selected as the pavement reinforcement geogrid for the project. More than 110,000m² have been installed on the site.

For more information contact chris@globalsynthetics.com.au
Charleville flood mitigation - PYRAMAT® and LANDLOK® High Performance Erosion control

The town of Charleville in western Queensland has experienced major flooding over the last few decades. A number of significant recent events have caused a combined damage to the township of some $100 million to both public and private infrastructure.

Murweh Shire Council (the local governing authority) commissioned consulting engineers SMEC Australia, to undertake various flood studies and the detailed design documentation for a major flood alleviation scheme around Charleville. It was proposed to raise the height of the existing levee around the town and to address the issue of 'breakout locations' which had not been identified in earlier studies that had used more simplistic hydraulic modelling techniques.

As part of the overall $14 million scheme, significant investment was allocated to protect various structures in the Bradley’s Gully area involved in the diversion of waters around the township. High Performance Erosion Turf Reinforcement Mats sold under the trade names of PYRAMAT® and LANDLOK® were specified for use in this critical part of the works to ensure long term protection of channels.

Both PYRAMAT® and LANDLOK® are synthetic rolled erosion products that are capable of withstanding high hydraulic forces when designed and installed correctly. To date, Murweh Shire Council have purchased some 22,000m² of PYRAMAT® and 10,000m² of LANDLOK®. Installation is being undertaken by local Queensland Transport and Main Roads staff.

Contact paul@globalsynthetics.com.au for additional details.

NEW PREMISES FOR GLOBAL SYNTHETICS SYDNEY

In June 2013, the Global Synthetics Sydney warehouse functions in Girraween moved to 41 Sammut Street in Smithfield. Our expanded warehouse capacity will be able to better service the needs of our New South Wales customers. Please note also that our Sydney phone and fax numbers have changed. However, our commitment to providing exemplary service has not!

www.globalsynthetics.com.au

For a comprehensive product catalogue, please email info@globalsynthetics.com.au

Call our Geosynthetic experts on:

- SYDNEY PHONE: (02) 9725 4321
- PERTH PHONE: (08) 9459 4300
- BRISBANE PHONE: (07) 3865 7000
- ADELAIDE PHONE: 0405 074 140
- DARWIN PHONE: 0411 171 737
- HOBART PHONE: 0410 665 016
- MELBOURNE PHONE: (03) 9791 1772

Product Listing

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<tr>
<td>Geotextiles - Nonwoven</td>
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<td>Geotextiles - Nonwoven</td>
<td>Geofirma®</td>
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<td>Geotextiles - Woven</td>
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<td>Geotextiles - Reinforcement</td>
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<td>Geogrids - Pavement</td>
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<td>Geogrids - Reinforcement</td>
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<tr>
<td>Geosynthetic Clay Liners</td>
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<td>Geomembranes</td>
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<td>Dewatering Tubes</td>
<td>ProTube®</td>
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<tr>
<td>Wick Drains</td>
<td>CeTeau®</td>
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CONFERENCES/EXHIBITIONS

Amir Shahkolahi and Jason Crase from our Queensland branch recently attended and presented at the 5th Australian Landfill and Transfer Stations Conference & Expo on the Gold Coast. Amir and Jason gave a presentation entitled Advanced Landfill Sealing System Design with Needle-Punched GCL, which was well received. The next Australian Landfill and Transfer Stations Conference & Expo is scheduled for 2015.


For details go to www.australiangeomechanics.org