AUSTRALIAN COMPANY // GLOBAL EXPERTISE

Global Synthetics

geonews

JUNE 2011 // ISSUE

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Welcome...

This newsletter updates our readers on a range of significant projects that **Global Synthetics** have had involvement over the previous few months. We are proud of the solutions that have been achieved and the positive outcomes for our clients.

As an 100% Australian-owned company, **Global Synthetics** offers you a complete range of high-quality geosynthetic products with the added assurance of more than 100 years of combined staff experience in the industry.

Global Synthetics can provide major benefits to your project. Whether your problem is one of drainage, reinforcement, retention, storage, filtration or protection, we have a product to suit your needs.

Speak to one of our engineers located throughout Australia or visit our website at **www.globalsynthetics.com.au** and see how we may assist in your next project.

Global Synthetics Educates the Market

A recent series of seminars were conducted throughout Australia and New Zealand to educate the engineering community in a number of geosynthetics products available through Global Synthetics.

These full day seminars were conducted by Dr Kerry Rowe and Dr. Barry Christopher.

Both speakers are recognised throughout the world as being most eminent in their respective fields of engineering. Dr. Rowe lectured on recent advances in barrier containment systems using products such as Geosynthetic Clay Liners (GCL's) and Geomembranes. Dr. Christopher gave a very informative talk on recent advances in Pavement Design with particular emphasis on the use of geosynthetic inclusion to enhance pavement performance. Recent large scale research in the USA was presented with the remarks that there are positive benefits in including a geocomposite product (geogrid/geotextile) within the pavement profile.

Global Synthetics offer the Bentofix® Geosynthetic Clay liner, Proliner® Geomembranes and a proven geogrid/geotextile composite product called Combigrid®.

Combigrid® Reinforces Container Hardstand in Gladstone

In 2010, Northern Stevedoring Services (NSS) committed to the opening of a new stevedoring operation in Gladstone at the Port Auckland wharf. A site was selected to utilise the existing adjacent rail corridor allowing NSS to offer a complete port logistics service to the Gladstone region.

As part of the development, NSS required a hardstand container terminal for storage and distribution of containers. This hardstand was to withstand the stacking of containers in many vertical multiples and be capable of supporting the loads of the container stackers and long reach equipment to be used on the hardstand.

NSS commissioned VDM Consulting to complete a suitable design for the hardstand providing a 25 year design life for the facility. The rubber tyred container handling equipment would weigh up to 40 tonne when loaded and all of this was to be built over a relatively weak subgrade of CBR 2.5% strength.

VDM completed a design option for the client with and without geogrid reinforcement. The preferred geogrid considered in the design option was the Combigrid® geogrid supplied and supported by Global Synthetics. Due to the high Secant Modulus of >1.1MN/m afforded by Combigrid®, the pavement could be designed using conventional techniques but with a theoretically improved CBR of 4.75% (an improvement of some 1.9 times). The secant stiffness of Combigrid® at typical low operating strains of 2% is significantly higher (a factor 2.5 times higher) than geogrids manufactured in other ways such as multi directional extruded polypropylene geogrids and flexible coated woven polyester geogrids.

The design was completed using the adopted 4.75% CBR (with Combigrid® present), with assumptions made on the number of container movements, the proportion of 20ft to 40ft containers and average container weights, ultimately showing a 400mm reduction of base course layer thickness could be achieved. The substantial time and cost savings based on this thickness reduction were clearly apparent and Combigrid® was ultimately selected for use.

A local contractor with more than 30 years experience in the area; Blomfield Excavations was awarded the construction contract and were very pleased with the ease of use of the Combigrid® composite geotextile/geogrid product. Being a composite product, the Combigrid® did not require an additional layer of geotextile to be laid for separation purposes.

The project was successfully completed in April 2011.

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Port Hedland Stays on Firm Ground

The Utah Point Berth Project (UPBP) at Port Hedland in northern Western Australia involved the development and operation of a common user bulk export facility, primarily to serve the mining industry in the Pilbara. Utah Point facilitates the development of a number of emerging commodities producers in the Pilbara region of Western Australia as well as providing a new facility for existing Port Hedland exporters. The throughput of the facility is expected to be in the order of 17 million tonnes per annum of various bulk products, predominantly iron ore and manganese.

Global Synthetics assisted Perth based VDM Consulting in design proposals for a range of different geosynthetic solutions at Utah Point including embankment support over soft ground, environmental barrier systems, erosion control & stormwater containment, with major construction activities occurring through 2009 and 2010.

In total, over 600,000m2 of speciality geosynthetics were supplied by Global Synthetics to this project providing a range of solutions to engineering challenges across the site.

The Utah Point Facility commenced operations in the latter part of 2010.

Embankment Support

The main Stockyard & Access Roads at Utah Point were to be built over extremely soft clay soils within mangrove wetland areas. The clay foundation soil is highly plastic with an undrained shear strength of approximately 10kPa. Embankment heights up to 5m, combined with exceptionally high live loads (100 tonne ore loaders), provided the designers with a challenge to ensure suitable embankment support using economical, innovative methods.

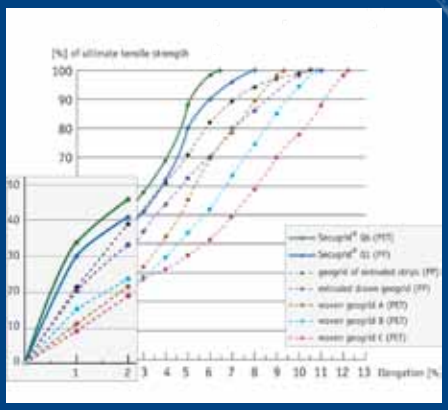
The designers selected a high performance geogrid from Global Synthetics as having the necessary performance requirements in this demanding application, to provide long term embankment stability and support.

The polyester (PET) Secugrid® 400/40 R6 (400kN/m x 40kN/m) & Secugrid® 120/40 R6 (120kN/m x 40kN/m) geogrids were designed to be incorporated in the embankments such that the vertical loads exerted by the embankment on the soft foundation soils were transferred into the horizontal geogrid layers. The Secugrid® R6 range incorporates mono-oriented 'bars' which carry extremely low strain at high imposed load & also exhibit lower creep than most other PET geogrids available today. These solid bars also have an inherent resistance to pH extremes, such as those found in acid sulphate soils. Other geogrids of woven or knitted construction are generally more susceptible to hydrolysis in such soil environments.

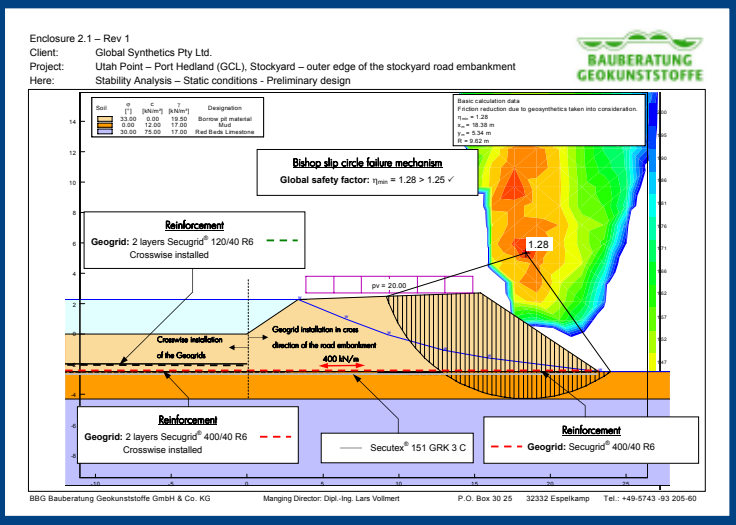
Installation of the Secugrid® presented a challenge to the appointed contractors given that it needed to be placed over the very soft mangrove subgrade. Swamp dozers & specially designed 'low pressure' buggies were utilised to deploy the Secugrid® rolls across the stockyard & road formations. Contractors Ertech Pty Ltd & Brierty Pty Ltd installed approx. 500,000m2 of Secugrid® over the two work areas at Utah Point.

Millions of m2 of Secugrid® & and the Secugrid®/geotextile geocomposite known as Combigrid®, have been installed across Australia and New Zealand in the last few years as designers & contractors recognise the performance benefits of these high performance geogrids in embankment and pavement support applications.

For further information, contact ***sean@globalsynthetics.com.au***



Secugrid® modulus comparison.



Typical output for Utah Point road embankment stability .

Erosion Control

The internal batters of the "Stockyard" storage areas at Utah Point are particularly prone to scour during tropical rainfall events. The dispersive silt content of the dredged fill in the stockyard necessitated the use of a high performance synthetic erosion blanket. Landlok® 300 is a 3 dimensional, high strength polypropylene matrix consisting of fibres which are highly UV stable. Given the difficulty in establishing short or long term vegetation within the stockyard zone, the client required a typical design life for the blanket of up to 10 years fully exposed to harsh Australian sun. Landlok® has been tested using the most rigorous accelerated U.V. ageing processes currently available. Landlok® 300 has an initial tensile strength in excess of 29kN/m(roll direction) and 26kN/m(cross roll direction). Through accurate & conservative extrapolation, Landlok® 300 is expected to retain a residual tensile strength of over 8kN/m after 10 years exposure in an unvegetated state for this application. This residual strength is in fact some 400% greater than the "as delivered" strength of some competing products.

Global Synthetic's Landlok® & Pyramat® range of high performance erosion control blankets have been designed to take soft armour erosion control to new levels. Landlok® & Pyramat® erosion blankets are capable of withstanding prolonged hydraulic flow events in channel & slope applications which would often be treated with rock armour or concrete systems. Proprietary software is available to determine product suitability for specific hydraulic, soil & surface profiles.

For further information, contact
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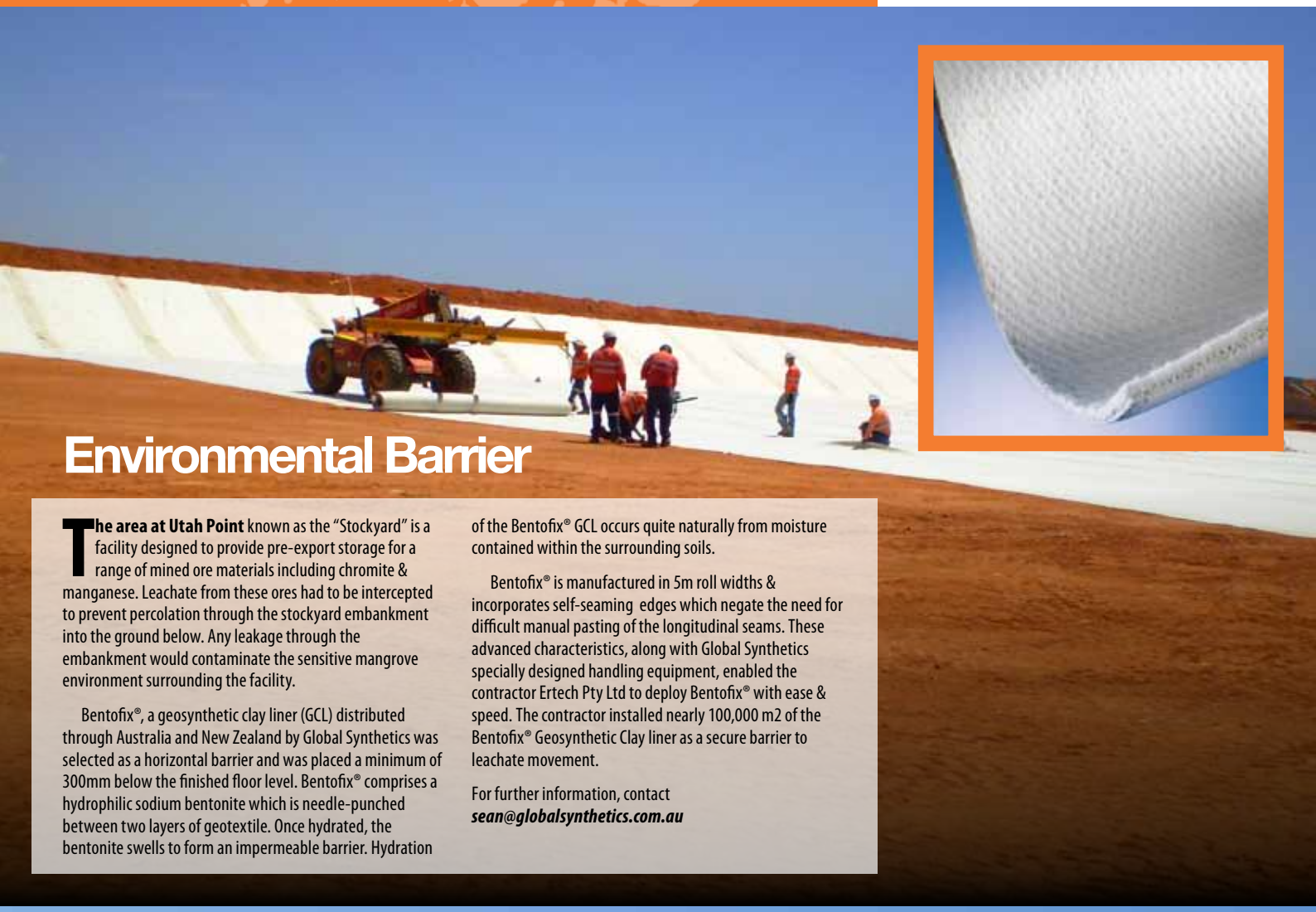

Environmental Barrier

The area at Utah Point known as the "Stockyard" is a facility designed to provide pre-export storage for a range of mined ore materials including chromite & manganese. Leachate from these ores had to be intercepted to prevent percolation through the stockyard embankment into the ground below. Any leakage through the embankment would contaminate the sensitive mangrove environment surrounding the facility.

Bentofix®, a geosynthetic clay liner (GCL) distributed through Australia and New Zealand by Global Synthetics was selected as a horizontal barrier and was placed a minimum of 300mm below the finished floor level. Bentofix® comprises a hydrophilic sodium bentonite which is needle-punched between two layers of geotextile. Once hydrated, the bentonite swells to form an impermeable barrier. Hydration of the Bentofix® GCL occurs quite naturally from moisture contained within the surrounding soils.

Bentofix® is manufactured in 5m roll widths & incorporates self-seaming edges which negate the need for difficult manual pasting of the longitudinal seams. These advanced characteristics, along with Global Synthetics specially designed handling equipment, enabled the contractor Ertech Pty Ltd to deploy Bentofix® with ease & speed. The contractor installed nearly 100,000 m2 of the Bentofix® Geosynthetic Clay liner as a secure barrier to leachate movement.

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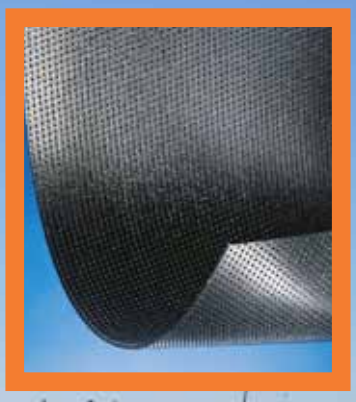
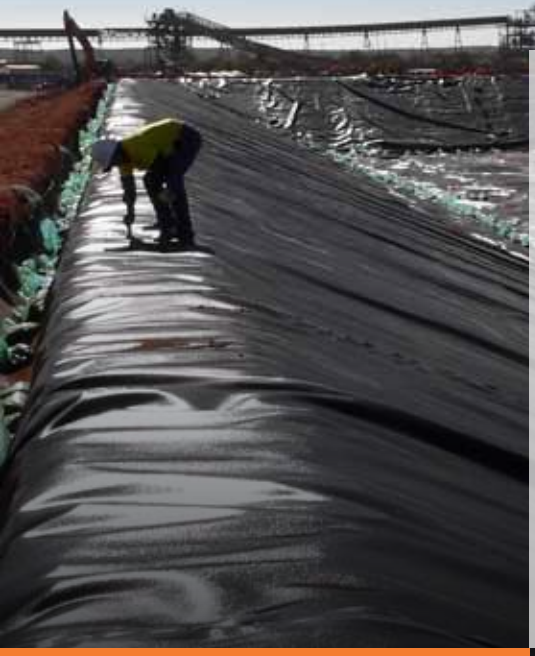


Stormwater Containment



The Port Hedland region sits at a latitude predominated by summer rainfall typical of tropical climates. Yearly cyclone & monsoonal rainfall events called for the inclusion of a large detention pond in the Stockyard design at Utah Point in order to mitigate the yard from flooding. The use of HDPE geomembranes is nothing new in these applications, but two important design criteria were considered paramount in the design; safe foot access within & around the pond and, secure anchorage of the geomembrane to prevent uplift of the liner during cyclonic winds whilst the pond is empty.

Carbofol® FM is a specialised geomembrane manufactured by Naue Germany. The geomembrane has a unique textured surface. The texturing could be described as miniature cones which are 'embossed' on the surface of the material as part of the extrusion process. Carbofol® FM has an 'Asperity Height' greater than most textured geomembranes on the market providing an exceedingly high interface friction coefficient. This characteristic not only enables Carbofol®FM to be specified for very steep batters but also offers safe traffic ability under foot where storage areas require regular access to personnel for inspection & maintenance. Such was the case at Utah Point.

Anchorage at the toe of the batters within the pond was trialled successfully using a new concept which had no known precedent in this type of scope. Global Synthetic's ProTube® units are normally designed for dewatering & erosion control applications but in this case, these high strength 'sausage shaped' woven geotextile ProTube® were placed in-situ & filled with sand to provide enough mass to anchor the geomembrane during severe wind events. ProTube® GT70/105 geotextile incorporates monofilament polypropylene yarns which exhibit very high permeability & resist clogging. ProTube® can be fabricated in a range of circumferences & lengths.

For further information, contact
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Glenugie Upgrade Alliance Project – Landlok® 450 Turf Reinforcement Mat Channel Treatments

Macmahon Contractors were the successful tenderer for an R.T.A. Roadwork's Package on the Pacific Highway, located just south of Grafton, NSW. The works package was for the upgrade of the existing Highway into a separated dual carriageway as part of the larger works programme for the overall improvement of the Pacific Highway between Sydney and Brisbane.

Integral to the project was the need to ensure successful treatment of the drains, channels and culverts on the project to minimise scour and protect structures.

The original tender requirement was for a combination of rock mattresses, rock rip-rap, concrete lining and an erosion control turf reinforcement mat (T.R.M) for specific treatment approaches in the drainage structures. Approximately 10,000m2 of a competitor's T.R.M was specified in the original tender documents.

Global Synthetics provided an alternative bid to the specified product using the Landlok® 450 TRM and demonstrated improved tensile resistance, enhanced U.V resistance and provided the client with substantial information on the proven performance of the product in a range of extreme hydraulic conditions.

Landlok® 450 is a synthetic turf reinforcement mat that provides positive "reinforcement" to grasses, prevents scour and allows vegetated drains to withstand hydraulic conditions that may normally be specified in traditional rock protection and concrete lining treatments. The drain is shaped and prepared, the Landlok® 450 is pinned into position over previously seeded areas, a light soil covering is placed over the Landlok® 450 and grasses allowed to germinate through the Landlok® 450. Significant shear stresses can be imposed on the composite system, well in excess of the conditions that traditional grass lined channels can withstand.

Macmahon Contractors have continued to be very sympathetic in their environmental considerations on this project. One example was the collection of indigenous local grass seeds that have been used, in conjunction with the Landlok®450 channel treatments and the wider revegetation treatments on this site, to ensure the maintenance of pre-existing environmental conditions long after Macmahon Contractors complete this current works package.

The success and the confidence that Macmahon Contractors have gained in the use of the Landlok® 450 product has now meant that over 30,000m2 will be installed on this site by project completion. Landlok® 450 is a product that has full testing and design software for use. In this Glenugie Upgrade Alliance Project, traditional rock and concrete structures were able to be replaced under given conditions of 5% maximum grade allowance. Significant cost savings have been achieved by the use of Landlok® 450 over more traditional treatments of scour protection while maintaining the focus of environmental responsibility that Macmahon Contractors pride themselves on.

During the construction of the project to-date there have been a number of extreme rainfall events with completed Landlok® 450 channels performing exceptionally well under such conditions says Macmahon Contractors Project Engineer Mr. John Crithary.

For further information, contact ***chris@globalsynthetics.com.au***

RTA Approval for ACEGrid®

Global Synthetics are pleased to announce that they have been successful in obtaining an approval under the RTA R57 Specification Document – Design of Soil Reinforced Walls.

The approval of the walling system by the Roads and Traffic Authority (NSW), incorporating concrete segmental blocks as the facing element and the ACEGrid® polyester reinforcement geogrid as the soil reinforcement element allows the Global Synthetics Wall System to be used on major infrastructure projects in Australia. Use of soil reinforcement techniques is recognised as being one of the most competitive methods to construct large height retaining structures.

Product approval under the R57 Specification gives the designer of such structures clear guidance on appropriate design values to incorporate for performance under the most demanding design conditions. Global Synthetics should be contacted for additional information on this approved wall system.

Product Listing

PRODUCT TYPE	PRODUCT
Geotextiles - Nonwoven	**ProFab®**
Geotextiles - Woven	**ProFab®**
Geotextiles - Reinforcement	**ACETex®**
Geogrids - Pavement	**Secugrid®**
Geogrids - Reinforcement	**ACEGrid®**
Rock Mattress	**Link Mattress**
Gabions	**Link Gabions**
Geosynthetic Clay Liners	**Bentofix®**
Geocells	**Miracell®**
HDPE Membranes	**Carbofol® & ProLiner®**
Geonet	**ProNet®**
Sheet Drains	**ProDrain®**
Drainage Cells	**Nerocell®**
Water Tanks Modular	**Ellipse®**
Erosion Blankets - TRM	**Landlok®**
Erosion Blankets - TRM High Performance	**Pyramat®**
Erosion Blankets - Biodegradable	**Jutemaster®**
Silt Fences	**Global**
Floating Silt Curtains	**Global**
Dewatering Tubes	**ProTube®**
Wick Drains	**CeTeau®**

www.globalsynthetics.com.au

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

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