

PERMATHENE NEWS

No 3

May 2002

Permathene Ltd has enjoyed a very exciting year with many new projects presenting us with an array of vastly different challenges. In February 2002 we presented a technical paper at the International Erosion Control Association (IECA) conference in Orlando, Florida.

Recently added are several new product lines including welded steel gabion and mattresses plus a brand new line of geogrids, due for product release next month and to be featured in our next newsletter. The welded steel gabions are US made and are designed for any applications which are prone to

corrosion, making them absolutely ideal for coastal works. Welded steel gabions offer many advantages over twisted wire mesh. These advantages can be viewed in pdf format on our website at www.permathene.com.

Our new line of geogrid is designed to offer a far greater range than has previously been available in Australia and New Zealand. Permathene Ltd has secured distribution rights for the Pacific region and India. Full design and engineering services will be provided through associate company Ground Solutions Binco Ltd, www.gsbinco.com.

Welded Gabions and Mattresses

New Product

Gabions and mattresses are not new technology, indeed they have been used since ancient Egyptian times 7000 years ago! This time proven system has changed little in concept and has been altered only by the types of materials used. Today the best gabions and mattresses are welded galvanised steel and protected by a fuse bonded PVC coating.

Welded steel gabions and mattresses offer many advantages over twisted wire. Permathene is now the exclusive distributor for this region for Modular Gabions. This is a very high quality product and is available in standard and custom sizes.

For any coastal work welded steel with fuse bonded PVC coating is far superior to twisted wire which by its very nature cannot offer the same level of



protection. Installation costs are greatly reduced, repairs are easier, useful life is increased, plus welded gabions and mattresses are far stronger (tests showed that welded gabions offer strengths of 4463 kg / lineal meter, compared to twisted wire strengths of 2976 kg / lineal meter along twist and 1139 kg / lineal meter across twist). This significant strength difference plus the added resistance to corrosion make welded gabions and mattresses the way of the future for New Zealand construction and engineering. Applications include retaining walls, revetments, weirs, river works, coastal defense systems, soil conservation.

De-sludging Project, Melbourne, Australia



Remediation of the lake in the Rippon Lea Estate in Victoria is a part of the National Trust of Australia (NTA) Site Remediation Action Plan. Several investigations and studies were carried out to determine how and under what limitations clean up could be performed. The long-term goals of the action plan are to identify contaminated NTA sites, investigate and, if necessary, remediate them within a 40-yr period. Several hundred of these sites involve contaminated sediments. Without remedial action the sediments and sludge would cause problems for many decades. The Rippon Lea Estate lake contained approx. 150m³ of sludge and the size of the lake is 2 - 3 acres x 1.2m deep. An alternative remediation method was selected that involved vacuum dredging and de-watering the sludge using high strength geotextile tubes as filters. Once de-watered the dredged material was to be disposed of in a landfill.

For this treatment process, a work area was set up off site in the nearby Australian Broadcasting Corporation car park. A pontoon with a pumping unit was designed, constructed and installed in the lake. A flexible pipeline was installed from the pump to the temporary de-watering area and from there to the mobile wastewater treatment unit. The sludge was pumped from the lake to the de-watering system.

The de-watering system consisted of two geotextile tubes; 20m long and 1.4m diameter, each fabricated from Syntex 4x4 high strength woven geotextile. This product has sufficient tensile strength to withstand the stresses associated with pumping. The fabric opening size may seem large when compared to the grain size of the dredged material, and might lead to

Client: National Trust of Australia (NTA), Vic.

Geosynthetic Consultant: Permathene Ltd.

Contractor: Green Waste Environmental Engineering, Victoria, Australia

Date: December 2001

Product: Syntex High Strength Tubes

the question of how efficient retention of solids could occur. The answer partly lies in the fact that a filter cake forms on the inside of the fabric shell, thus creating the equivalent of a two-stage filter. Filtration efficiencies above 98% are not uncommon for fine grained dredge materials filtered through Syntex 4x4.

The dredged material was pumped into the tubes, the water percolated out through the fabric, leaving dense sludge and sediments behind. Pumped until full, the tubes reached heights of 0.8 – 1.0m and widths of 1.6 – 1.8m on completion. A 20m long tube contained nearly 20m³ of dry sludge material.

De-watering and consolidation in the geotextile tube reduced the volume of the dredged material by a factor of 7 to 8 within 2 - 4 weeks of filling the tube. The dredged material was highly cohesive and had a high organic content. The ideal process rate for the treatment is between 3 - 5m³ per hour.

The project was very successful with Syntex tubes providing a cost-effective solution to a very difficult dredging project. The tubes de-watered the material at a greatly accelerated rate when compared to open air retention, and eliminated safety issues inherent with disposal pits. The de-sludging provided a significant increase in the storage volume of the lake to allow for reticulation of the Rippon Lea Estate gardens. Although dredge-filled geotextile tube technology has been used for many years, recent high profile projects have brought attention to the industry. The technology is still young, but with newer and better protocols being realised the future certainly looks bright for dredge-filled geotextile tubes.

Wetlands Stabilisation Project, Katikati, New Zealand

The economic implications of treating water for sediment and pollution from a 3500m² urban sawmill was cited as primary considerations in the design and construction of three storm water ponds. All the storm water from the log yards, processing plants, etc. was designed to go into these ponds. The artificial wetland was designed and constructed by Claymark Group Ltd with assistance from Permathene Ltd. The wetland will function as a natural bio-filtration system to remove sediment and pollutants from runoff flowing into the neighbouring areas. From the onset of the project there was a need for immediate erosion control, reduction of both on and off-site runoff velocities, sediment control and rapid vegetation establishment in the development of a bio-filtration system. Immediate and permanent sediment and erosion control was vital for this site in sustaining its functional longevity and the subsequent reduction in pollution for the neighbouring communities. The reduction in runoff velocities would allow the sediment and attached pollutants to settle from the slower moving water. Landlok TRM 450 turf reinforcement mat was determined to meet the long-term erosion control needs for this artificial wetland. Witty Bindra, Manager Asia Pacific for Permathene Ltd and Jim Black, Construction Manager of Claymark Industries Ltd worked together to select the most suitable erosion control material for this site. Numerous environment advantages were afforded to this site by the Landlok TRM 450 mats. These mats were selected to permanently reinforce vegetation in those areas where runoff flows concentrated. The matting's permanent three-dimensional net structure promotes stem and root entanglement and will ultimately provide permanent



vegetation reinforcement.

In consideration of all these factors, the Landlok TRM 450 will provide an economic savings for this project through reduced installation costs and water treatment as compared to hard armor alternatives (ripraps), while increasing the functional longevity of the wetlands.

In this project, Landlok TRM 450 worked because of its unique three-dimensional construction that creates a thick matrix with numerous void spaces. Through soil filling, sediment retention and proper seeding, vegetation develops within the complex matrix and into seed beneath, anchoring the entire structure firmly to the ground.

This use of Landlok TRM 450 in wetlands remediation has demonstrated the environmental and economic importance of geosynthetic erosion control measures. This product has effectively reduced the amount of sediment impacting the artificial wetlands, avoiding immediate failure of this system and extending its functional longevity.

Landlok TRM 450 is manufactured in USA by SI Corporation, a recognised world leader in permanent and temporary erosion control solutions. Landlok TRM 450 is distributed exclusively in New Zealand and the Pacific Islands by Permathene Ltd.

Client: Claymark Sawmills

Consultant: Stiffe Hooker Ltd, Auckland

Contractor: Claymark Group, Katikati

Date: November 2001

Product: Landlok TRM 450

Water Containment, Marsden Point, New Zealand

Carter Holt Harvey LVL facility in Marsden Point wanted to line a storm water pond to hold approximately 2.5 million gallons of storm water. Tonkin and Taylor designed the pond and selected Permaliner FPA (Flexible Polypropylene Alloy) 1mm liner for the job. By virtue of its chemical composition, molecular structure and thermodynamic properties, polypropylene is one of the most resistant



Client: Carter Holt Harvey, Marsden Point

Consultant: Tonkin & Taylor Ltd, Hamilton

Contractor: United Carriers Ltd, Whangarei

Date: September 2001

Products: Permaliner, Syntex 501, 1001

organic raw materials known today. A proper drainage system was designed which comprised of rows of 150mm diameter perforated PVC pipes on sandy sub grade, covered with 200mm of loose 40/16 aggregate and Syntex 501 Nonwoven Geotextile cushion on top of the aggregate. Syntex 501, manufactured by SI Corp. USA and distributed exclusively in New Zealand by Permatherne has been specifically designed for use in landfill or waste disposal facilities. 6m x 100m rolls of Permaliner 1mm were shipped to site and fabricated to fit the existing pond profile. Proper panel placement was facilitated by cross referencing each numerically identified panel with a layout plan approved by the Consultant and client. All the site tests were conducted to comply

with the project's QC/QA requirements.

The correct installation and welding of the Permaliner is of paramount importance since the integrity and long term performance is dependent upon it. The welding of the liner was executed by using various methods including dual track fusion welding and extrusion fillet welding methods.

The entire area of 7000m² was covered in approximately 7 days including welding of 7 pipe boots of 300mm OD on site. On the finished liner surface, 200mm of coarse sand was evenly placed using rubber track excavators and spreaders. The side slopes were covered with Syntex 1751, heavy weight geotextile cushion before covering the area with 75mm thick reinforced concrete. The heavy weight nonwoven geotextile was selected because it exhibited a higher angle of friction and greater puncture resistance to protect the liner from any damage.

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- **Geomembranes:** pond liners, floating covers, water containment, landfill, gas membranes
 - **Geotextiles:** reinforcement, stabilisation, filtration, erosion control
 - **Geogrids:** reinforcement, stabilisation
 - **Turf Reinforcement Mat (TRM):** erosion control, ground stabilisation, weed control
 - **Gabions, mattresses:** retaining walls, river works, revetments, coastal defense systems
 - **Subsurface drainage:** modular drainage for basements and underground construction

For any further information on these products and projects, please contact us.
