



TenCate Solutions for Infrastructure



Protective Fabrics
Space Composites
Aerospace Composites
Advanced Armour

Geosynthetics
Industrial Fabrics
Grass





Polyfelt® Nonwoven and Mirafi® Woven Geotextiles

Subgrade stabilization

Case Study

project | Peat Stabilization

location | Indonesia

For paper pulp factories, access to raw materials is the pulse of the business. However, driving trucks laden with timbers over soft soils is no easy task and a frustrating experience. The simplicity of covering the entire soft area with TenCate Polyfelt® nonwoven geotextiles to create a stable access platform was the best solution to a problem like this. TenCate Polyfelt® geotextiles, known for their superior robustness and filtration capability offered the most economical solution. This solution also enabled fast construction and provided a problem-free access road into and out of the timber harvesting site. Where the soil conditions were particularly bad, TenCate Mirafi® woven geotextiles or TenCate Polyfelt® reinforcing composite geotextiles were used. These geotextiles provided the additional tensile stiffness and reinforcement capabilities to support heavy loads.

Subgrade stabilization is one of the most common geotextile applications. The geotextile, placed at the interface between the soft subgrade and the granular fill material, prevents the loss of the granular fill into the soft subgrade, thereby maintaining the structural integrity of the granular fill layer.

Geotextiles used for subgrade stabilization must meet specific mechanical and hydraulic requirements in order to perform properly. Two external factors govern the mechanical requirements of the geotextile. These are the strength of the soft subgrade beneath the geotextile, and the type of granular fill material placed above the geotextile. The geotextile has to be more robust the weaker the subgrade below, and the larger the stone sizes used in the granular fill material above. The hydraulic properties of the geotextile must ensure adequate movement of groundwater out of the soft subgrade.



TenCate Polyfelt® and TenCate Mirafi® geotextiles are ideal for stabilization of soft subgrades.



TenCate Polyfelt® nonwoven and TenCate Mirafi® woven geotextiles provide the mechanical and hydraulic properties required to ensure robust mechanical behaviour and the accommodation of varying insitu groundwater conditions. Made from needlepunched polypropylene fibres, TenCate Polyfelt® nonwoven geotextiles are ideally suited for moderately soft subgrades. TenCate Mirafi® woven geotextiles are ideal for very soft subgrades because of their good tensile strength and stiffness properties. These geotextiles are ideal for engineered load support structures like road pavements, railroads, aircraft runways and taxiways, container loading yards, construction platforms, earth fills and low embankments.

Cost effective and easy to install, both TenCate Polyfelt® nonwoven and TenCate Mirafi® woven geotextiles have an impressive track record demonstrating good performance under varying ground conditions, thus making them the perfect solution for stabilizing soft and saturated subgrades.



TenCate Polyfelt® *nonwoven geotextile.*



TenCate Mirafi® *woven geotextile.*





Polyfelt® Nonwoven Geotextiles

Subsurface drainage

Case Study

project Sports Field

location Malaysia

High rainfall in Malaysia can be a nuisance especially when the accumulated water is not able to drain quickly. This is especially true in sports fields where puddles form as a result of rainwater, bringing disruptions to sports events. To prevent the problem, TenCate Polyfelt® TS nonwoven geotextiles are used as a filter in the drainage system below the sports field. The drainage system usually consists of aggregates placed in dug trenches. To prevent the erosion of adjacent soil into the aggregates and thus clogging the drainage system, TenCate Polyfelt® TS nonwoven geotextiles have been used as a filter. TenCate Polyfelt® TS has high permeability and optimum opening size to ensure the quick discharge of water which helped maintain the integrity of the drainage system and keep the field dry.

Drainage system failure occurs most often from system clogging when the drainage aggregate and pipe becomes contaminated with the surrounding soil. This clogging can result in failure of the structure.

To prevent clogging, TenCate Polyfelt® nonwoven geotextiles can be placed between the drainage aggregate and the soil to be drained. The geotextiles act as a filter and separator, retaining the natural soil while allowing water to pass into the drainage system. The gradation of the soil to be filtered must be compatible with the pore size distribution of the geotextile. The manufacturing process used by TenCate allows the formulation of an ideal pore size distribution in the geotextile for optimum soil filtration.

TenCate Polyfelt® nonwoven geotextile filters are robust to withstand installation stresses and rough backfilling procedures. Typical applications of TenCate Polyfelt® nonwoven geotextiles include road edge drains; filters behind gabions and retaining walls; sports field drainage filters; drainage of golf course greens and sand bunkers; architectural and landscape drainage; and agricultural drains.

The excellent filtration properties and robust, yet flexible, behaviour makes TenCate Polyfelt® nonwoven geotextile the ideal material to be used for subsurface drainage filters.



Polyfelt® PGM and PGMG Geotextiles

Pavement overlays

Increased traffic frequency and axle loads combined with changes in pavement temperature exert stresses on asphalt pavements. These stresses induce the formation and propagation of cracks in the asphalt pavement, allowing precipitation and oxygen to penetrate into the underlying structure, thus accelerating the deterioration of bitumen binders. The end results are cracked pavement layers and stripping of the asphalt surface.

TenCate Polyfelt® PGM and PGMG are paving geotextiles specially manufactured for pavement rehabilitation to extend the life span of stressed pavements. TenCate Polyfelt® PGM is designed to provide optimum absorption of bitumen that effectively bonds the new asphalt overlay to the old pavement providing a waterproof layer within the pavement structure. It is suitable for applications on low to moderate trafficked roads. TenCate Polyfelt® PGMG is a pavement reinforcement composite utilizing fibreglass yarns and is ideal for use in airport runways, highways, container yards, cracked concrete pavements, and for cement-treated subbases.



TenCate Polyfelt® PGM.



TenCate Polyfelt® PGMG.



Case Study

project	Airport Runway Rehabilitation
location	Thailand

The resort island of Phuket receives huge tourist inflows annually. The major gateway to the island was served by a small airport with one over-used runway. The authority decided to rehabilitate the airport and strengthening of the runway was one of the main improvements. The old pavement was planed down by about 100mm, cleaned and sprayed with a coat of pure bitumen. Then high strength TenCate Polyfelt® PGMG paving geotextile was laid using special laying equipment. Finally a new asphalt overlay was placed over the geotextile and compacted. In critical areas along the runway, several layers of TenCate Polyfelt® PGMG were used. The construction activity took place at night due to the heavy aircraft traffic during the day. By dawn the runway was ready to receive the first flight of tourists.





Polyfelt® Alidrain Prefabricated Vertical Drain

Accelerated consolidation

Case Study

project	Airport Expansion
location	Malaysia

To cope with the increased flight and passenger activities, replacement of the present budget airport terminal was required. The main challenge for the new facilities was that they had to be constructed over soft foundation soils to tight deadlines. Having considered all design options, it was decided that the use of prefabricated vertical drains (PVD) was the most viable solution. For this solution to work, TenCate Polyfelt® Alidrain PVDs had to perform to ensure continuous high flow of fluid in the core even under high soil compression or extreme construction conditions. The result was that the foundation soil was consolidated in a short time period for subsequent construction activities. In total, nearly 60 million linear meters of TenCate Polyfelt® Alidrain PVDs were used for this project.

To prevent later problems of excess settlement, it is important that excess pore pressures be removed from soft foundation soils within a short time frame. This ensures that foundation shear strength is increased quickly to support embankment and fill loadings. However, soft compressible foundation soils have a low hydraulic conductivity and it takes a long time for excess pore pressures to dissipate and the soil to consolidate. To reduce consolidation time, TenCate Polyfelt® Alidrain prefabricated vertical drains (PVD) are installed to provide a shorter and easier drainage path for the pore water to drain. This speeds up consolidation and the soft foundation gains in shear strength quickly.

TenCate Polyfelt® Alidrain PVD comprises a synthetic drainage core wrapped with a durable fabric of excellent filtration properties. The vertical drain is designed to allow free flow of water in all directions and to ensure the integrity of the drainage system when subjected to tensile, compressive and buckling forces as the soft soil deforms and consolidates.

Once the vertical drains have been installed, fill is placed over the top of the site in order to generate excess pore pressures in the soft foundation soil. The excess pore pressure enables the pore water to drain out of the foundation soil and up the PVD where it is dissipated into a surface drainage blanket, beneath the placed fill. Once the desired consolidation has been achieved, construction continues. A site can be completed in a number of months rather than a number of years if PVDs are not used.



During the consolidation process, lateral soil displacements can cause drains to elongate while vertical soil compression may cause drains to fold and buckle. Drain performance under both conditions must be considered when selecting a PVD as drain failure can jeopardize the construction schedule of the project and the stability of any structures built above it. The complete range of TenCate Polyfelt® Alidrain PVD has been specifically designed to ensure that adequate drainage capability is maintained at all times, even under the most severe soil conditions.

TenCate has the capability to supply large quantities of TenCate Polyfelt® Alidrain PVD to fast-paced projects that require the delivery of the drains within a tight schedule. Its track record in high profile projects is a testament of its reliability to supply high quality and cost effective PVDs for soft soil consolidation projects.



TenCate Polyfelt® Alidrain SK.



TenCate Polyfelt® Alidrain HB.



TenCate develops and produces quality products that increase performance, reduce cost, and deliver measurable results by working with our customers to provide advanced solutions.

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