



Asphalt Reinforcement

A guide to the selection
and specification of
ABG Rotaflex Asphalt
Reinforcement System



Asphalt is one of the most commonly used materials for the surfacing of roads and airport runways, taxiways as well as other trafficked structures such as car parks and distribution centres.

The low tensile strength of asphalt means it can be easily damaged by a number of factors including settlement, fatigue, temperature fluctuations and vehicle loadings.

Damage arising from reflective cracking usually manifests as a cracked or broken surface which has implications both for the comfort of the road user, vehicle damage and also to the subsequent on-going maintenance costs to the operator of the paved area.

The ABG range of asphalt reinforcement grids offer systems designed specifically to mitigate these issues, offering increased life cycles for the pavement and a reduction in both new build and on-going maintenance costs.

The use of geosynthetics offer many benefits over the traditional methods of construction which they replace including reduced construction times, and thereby, project costs. By allowing thinner pavements to be designed they help minimise the environmental impact of the project by reducing the volume of materials used thereby reducing the transport loads both to and from the site.

ABG offer a complete service in the field of asphalt reinforcement from initial design right through to a complete installation service.

Contents

Rotaflex Introduction	4-5
Rotaflex applications	6-9
About ABG	10-11

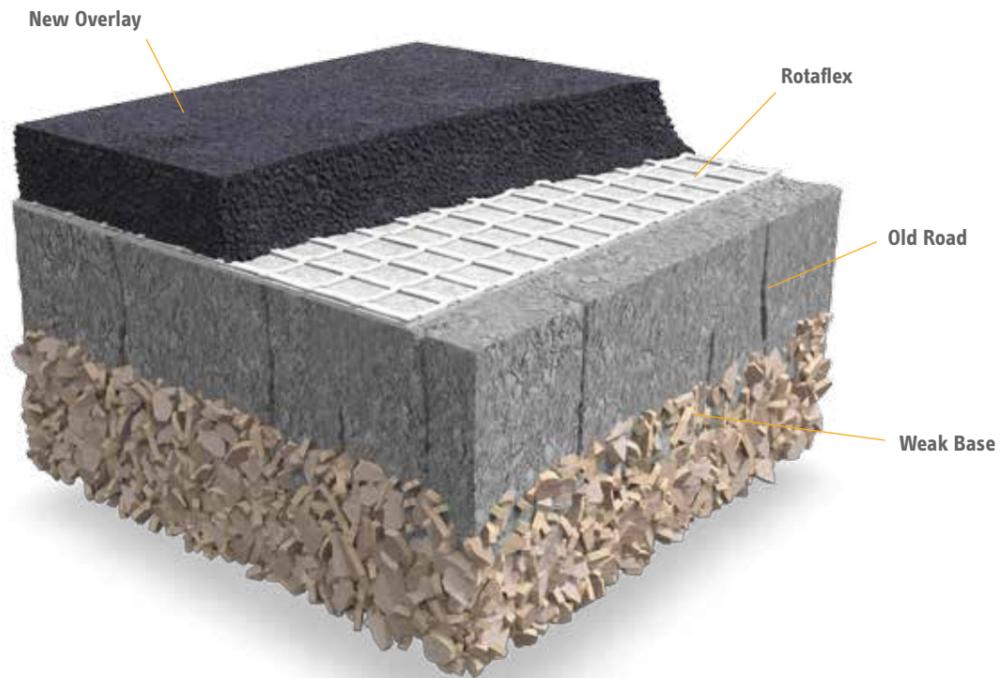
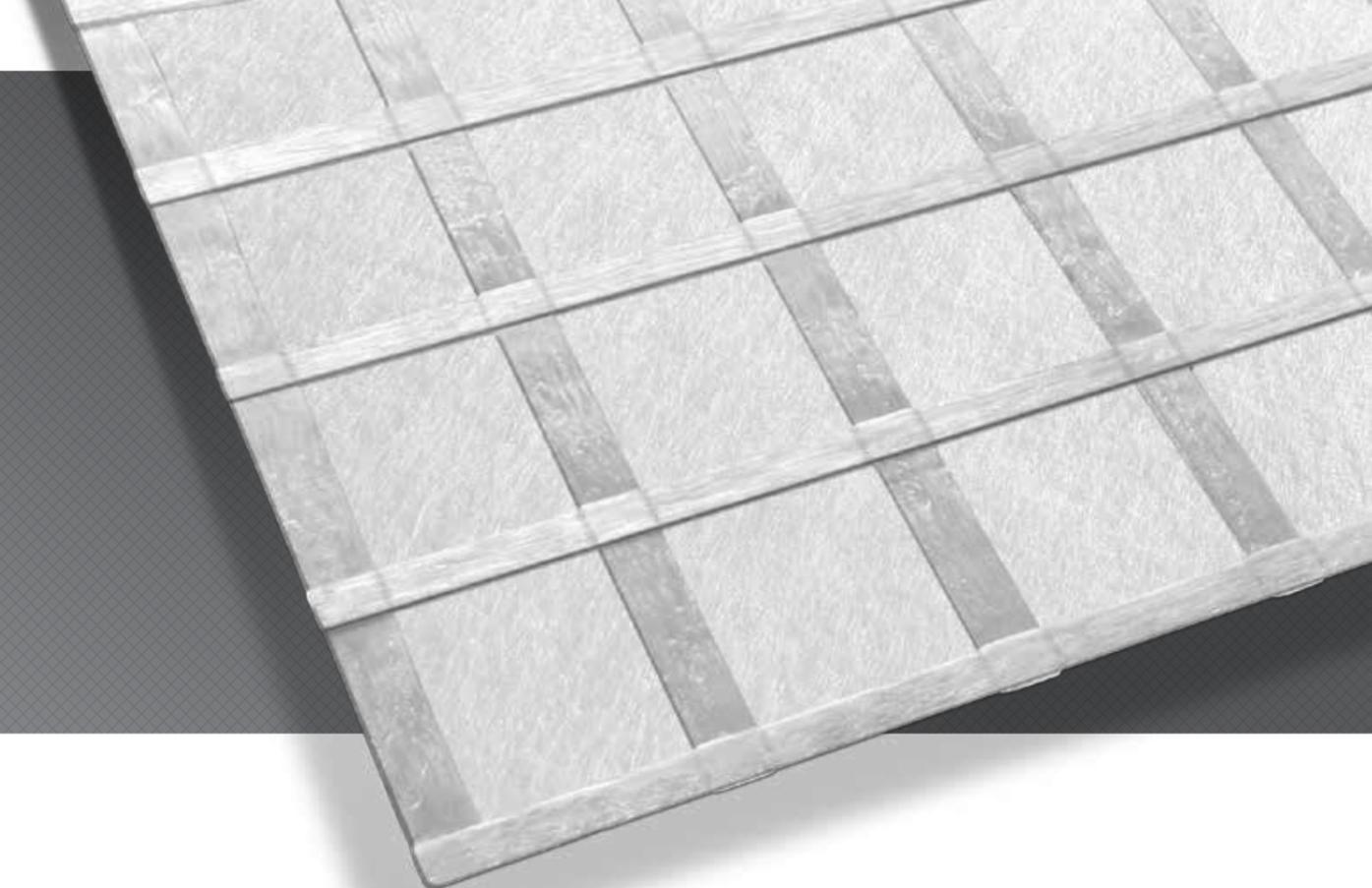
Rotaflex

Rotaflex is an asphalt reinforcing system comprising of a coated glass fibre grid bonded to a polyester geotextile.

It forms a key component of sustainable road maintenance and construction and is designed to provide crack control, pavement reinforcement and to prevent premature road break-up occurring as a result of increasing axle loads.

Extensive on-site experience and research by major road laboratories has demonstrated the benefits of Rotaflex in eliminating or retarding reflective cracking, reducing rutting and extending fatigue life of pavements. A four times increase in service life due to traffic loads may be obtained or alternatively a saving up to 30% of pavement thickness can be made.

Rotaflex works by preventing strains within asphalt layers reaching critical levels. Laid within an asphalt/bitmac pavement Rotaflex provides four essential requirements for effective reinforcement, strengthening, sealing bond and stress absorption.



Rotaflex glass fibre grids are widely used in asphalt reinforcement and offer high tensile strength at low strain for effective reinforcement. The grids are dimensionally stable and bonded at the nodes within a protective polymer coating.

Glass fibre is both strong and flexible. It is thermally and chemically stable at bitumen mix temperatures of 200°C; it is not effected by de-icing salt, petroleum or bitumen. The high strength, low strain characteristics are important because unreinforced asphalt will crack at strains as low as 1%. Glass fibre has a Young's Modulus of 70GPa (20 times that of asphalt) which means it provides effective reinforcement.

The aperture size has been optimised to be compatible with the tensile strength of the grid and the aggregate size of the overlay to ensure excellent interlayer bond.

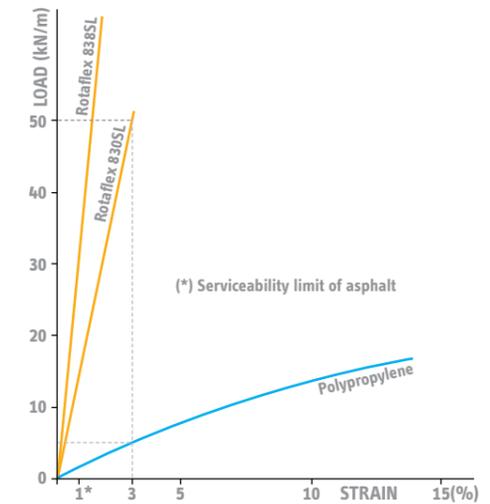
The polyester textile absorbs bitumen during installation to create a waterproofing layer with excellent bond and stress absorption.

Rotaflex provides a more environmentally acceptable solution than thick overlays, deep planing or full reconstruction. Reduced overlay thickness requires fewer vehicle movements and helps conserve natural resources.

Installation

Rotaflex is easy to handle and is rapidly installed. The road surface is swept and all pot holes and large cracks are filled with a bituminous material.

Bitumen emulsion or pure bitumen is sprayed on the prepared surface and Rotaflex is unrolled. The bitumen does not penetrate all the way through the Rotaflex until the Asphalt is laid, this permits the paver, trucks and limited site traffic to run on Rotaflex without damaging or pick up. The overlay is laid to normal specifications, temperatures, compaction and weather conditions.



Strain Compatibility

Hooke's Law states that for any given stress in a material there is an associated strain. When the concern is reducing cracks in asphalt the consideration is limiting the strain. At the serviceability limit Rotaflex is at least 2-3 times stronger than polypropylene systems and therefore far more effective at inhibiting cracking. Many polypropylene grids cite ultimate tensile strength but this is not a true indicator of performance.

Control of Reflective Cracking

Using Rotaflex in preventing reflective cracking can extend the service life of pavements by up to a factor of 10. Rotaflex provides reinforcement to help prevent crack propagation and enables the overlay thickness to be reduced.



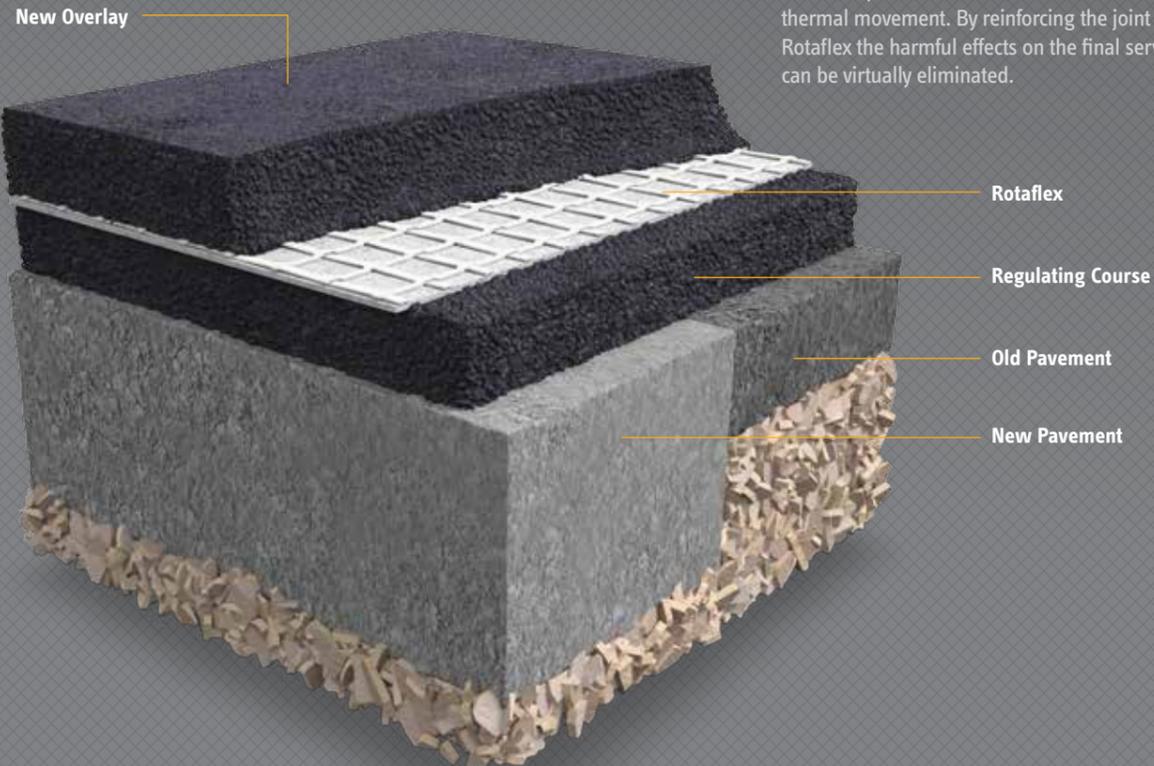
Thermal Fatigue

Thermal movement within concrete pavement results in contraction and expansion at construction joints. It is essential that the concrete pavement is well seated, a regulating course may be required. Rotaflex is laid to reinforce the new overlay and prevent or retard cracking.



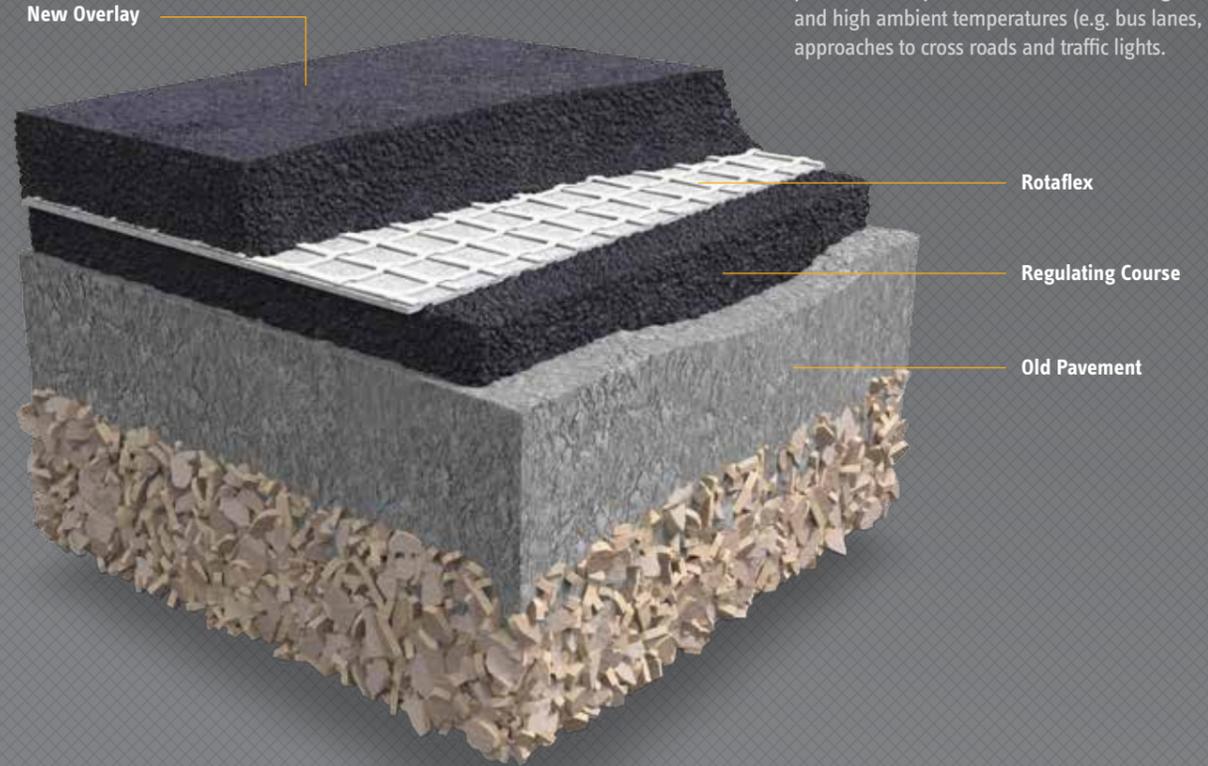
Widening and Haunching

A major problem in road widening schemes is that the new and old pavement structures tend to move apart due to differential settlement and thermal movement. By reinforcing the joint with Rotaflex the harmful effects on the final service can be virtually eliminated.



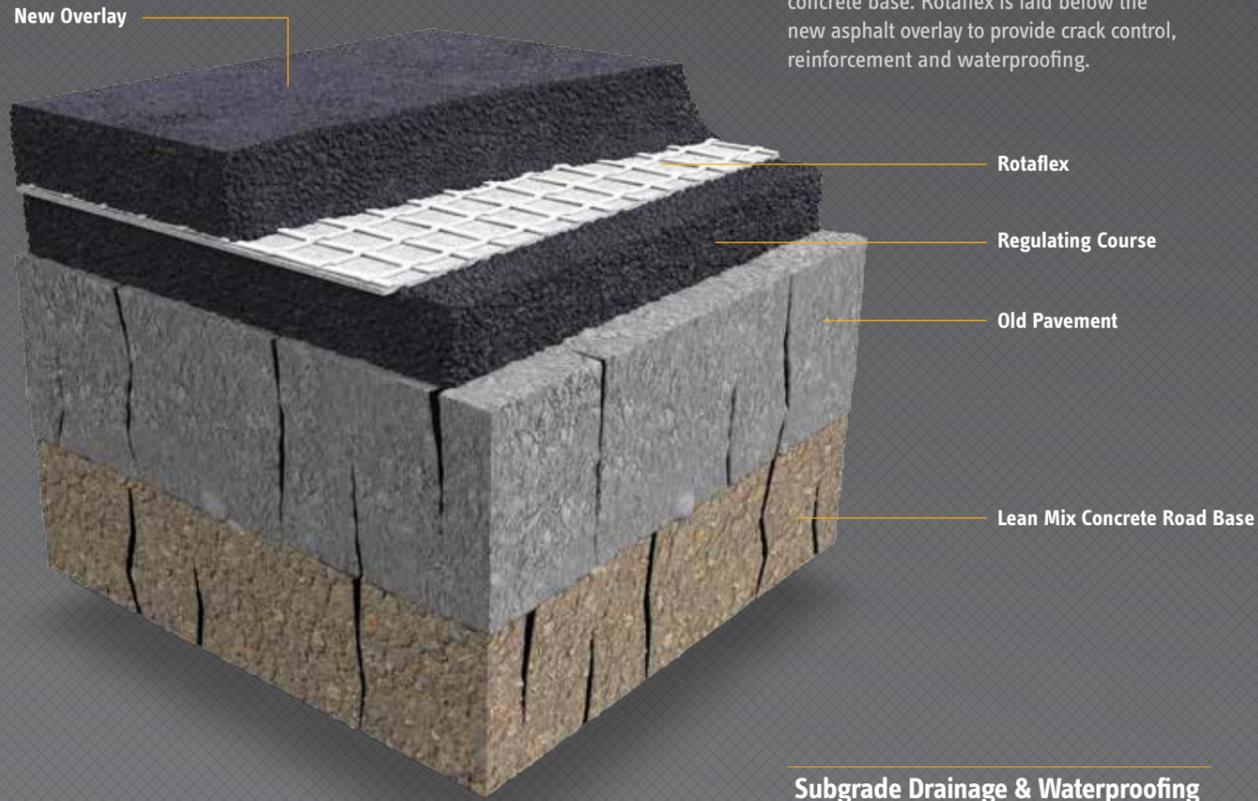
Rutting

Rotaflex is used in conjunction with stiffer bituminous layers to reduce rutting in pavements subject to intense wheel loadings and high ambient temperatures (e.g. bus lanes, approaches to cross roads and traffic lights).



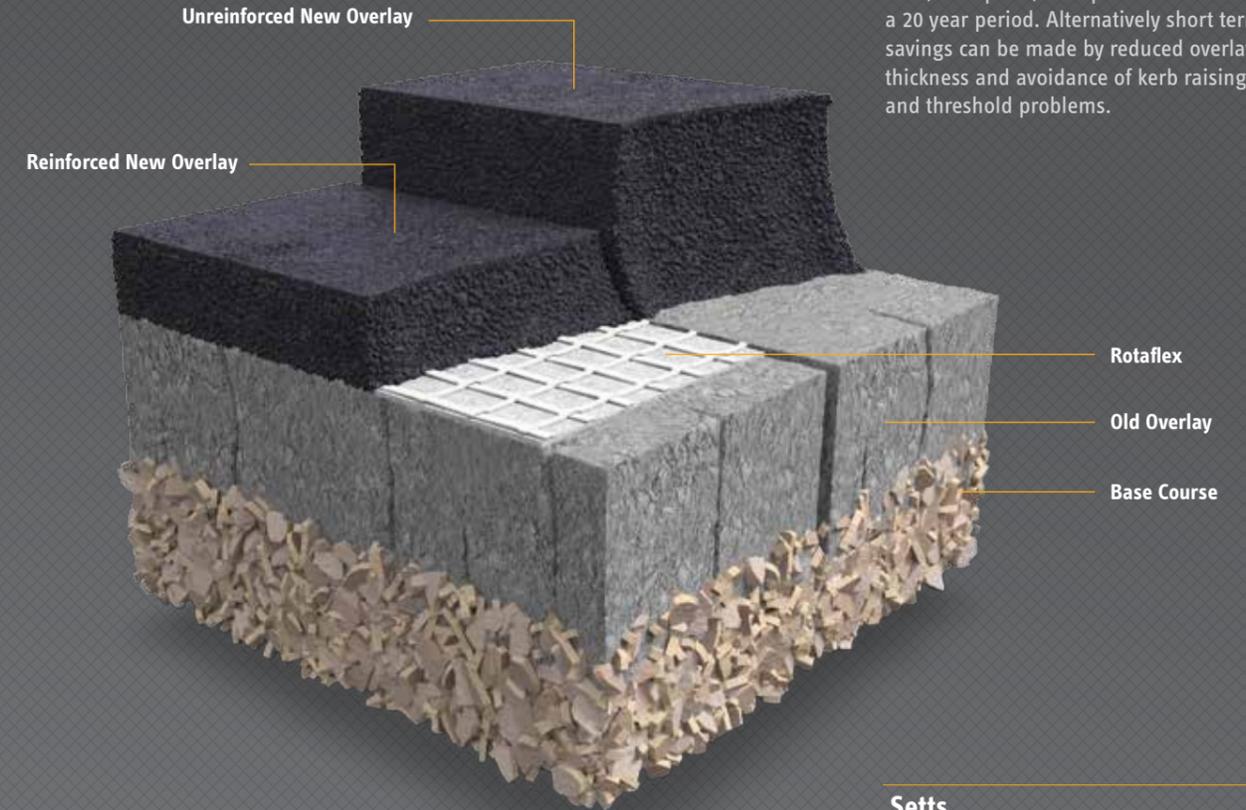
Lean Concrete Roadbase

This is perhaps the most common problem faced by highway engineers. Rotaflex glass fibre used in resurfacing of roads with a lean concrete base. Rotaflex is laid below the new asphalt overlay to provide crack control, reinforcement and waterproofing.



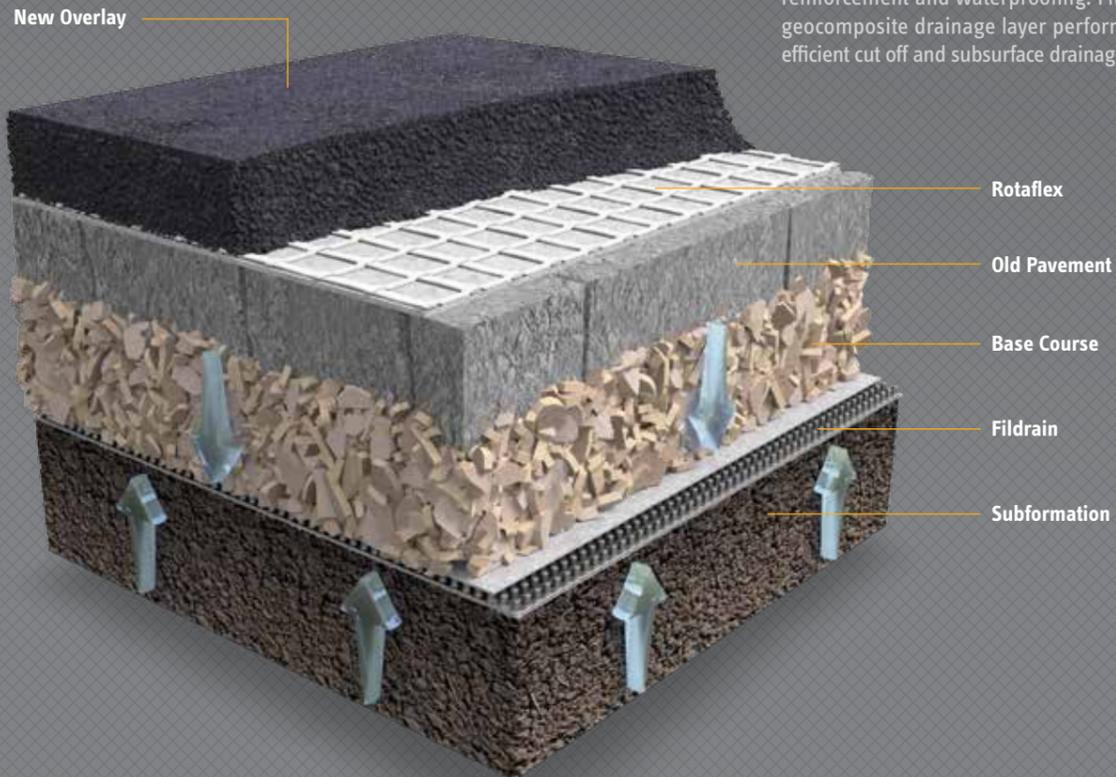
Economical Resurfacing

The increased overlay life using Rotaflex can save one or more future overlays. This saves time, disruption, and up to 75% of costs over a 20 year period. Alternatively short term savings can be made by reduced overlay thickness and avoidance of kerb raising and threshold problems.



Subgrade Drainage & Waterproofing

Adequate subgrade drainage of pavements is the key factor for extending pavement life. Rotaflex is used with the asphalt overlay to provide reinforcement and waterproofing. Fildrain geocomposite drainage layer performs as an efficient cut off and subsurface drainage system.



Setts

Sett paved roads pose engineer serious problems as it is unwise to remove solid well seated setts, but overlays will crack and delaminate. Rotaflex prevents cracking and holds surfacing materials together.





Structural Drainage

ABG have vast experience in drainage solutions and the systems have been used globally on major highway projects.

Deckdrain is a geocomposite drainage system used to relieve external water pressure from behind retaining walls, bridge abutments culverts and beneath block paved areas.



Verge Reinforcement

Vehicle over-run onto soft verges presents a serious safety hazard when vehicles which stray onto the verge. Deep rutting can form and during heavy periods of rain significant wash out can occur.

ABG ConcertinaWeb is a geocellular containment system which confines and strengthens infill materials and provides a cost effective solution for the reinforcement of roadside verges and prevention of stone scatter.



Erosion Control

ABG has a complete range of products suitable for erosion control and top soil retention on steep slopes on highway projects. These products cover a broad section of erosion control requirements including biodegradable, non-biodegradable and pre-seeded varieties. ABG erosion control products can help with both the surface protection and structural stability of soil slopes.



Retaining Walls

Webwall is a retaining wall system based on geocell technology, comprising layers of three dimensional cellular matrix usually infilled with site won materials. Using Webwall, ABG are in a position offer full PI covered design, material specification of the drainage works and then installation of the Webwall system through to final planting of the face with the right plants selected for the project.



Filtration and Separation

ABG have a complete range of geotextiles suitable for a wide range of filtration, separation and protection applications in civil engineering projects. The range comprises both woven (Abtex) and non-woven (Terrex) geotextiles each with a wide range of grades and performance.



Sub-base Reinforcement

The use of geogrids is common practice on highways projects to both strengthen weak sub-bases or reduce the depth of imported fill required within the pavement construction. ABG has a range of sub-base reinforcement products including a high-performance Trigrid, Abgrid and Abweb, a three dimensional mattress advocated for use in no-dig applications such as in areas where protection of tree roots is an issue.



Asphalt Reinforcement

ABG have a range of glass fibre reinforcement grids designed specifically for use in the reinforcement of asphalt layers in carriageway construction. Rotaflex and Rotagrid both work by preventing strains within asphalt reaching critical levels. When laid within an asphalt pavement they provide the four essential requirements for effective reinforcement, strengthening, sealing, interlayer bond and stress absorption.



Asphalt Reinforcement

Dekotex indicator layer is a self-adhesive grid, coloured bright red for high visibility to quickly show in any arisings during works on bridge decks. Traditionally bridge deck waterproofing has been protected by a red asphalt sand carpet which is expensive, difficult to obtain and not always obvious in arisings. Dekotex indicator layer will quickly show in the arisings and warn of the proximity of the bridge deck waterproofing to be protected.



Fildrain

A high performance, economic alternative to traditional stone groundwater drainage solutions and are used extensively in a wide range of applications from highway edge drainage through to landscape drainage. Fildrain also has applications in the drainage of embankments, reinforced earth structures, cut of trenches on contaminated land and landscape applications. Fildrain offers a viable cost effective alternative to traditional drainage systems formed using a geotextile filter and drainage stone medium.

About ABG

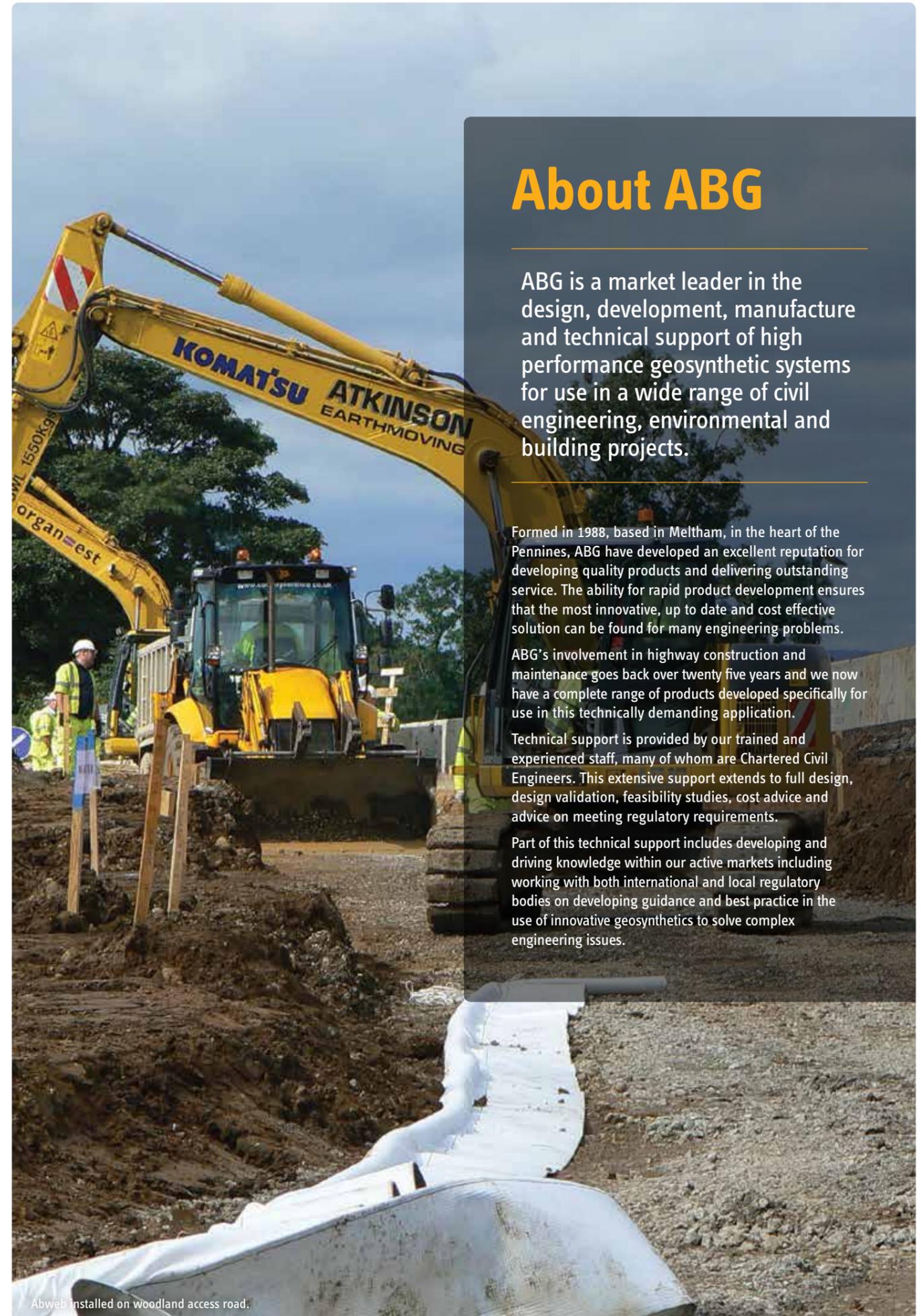
ABG is a market leader in the design, development, manufacture and technical support of high performance geosynthetic systems for use in a wide range of civil engineering, environmental and building projects.

Formed in 1988, based in Meltham, in the heart of the Pennines, ABG have developed an excellent reputation for developing quality products and delivering outstanding service. The ability for rapid product development ensures that the most innovative, up to date and cost effective solution can be found for many engineering problems.

ABG's involvement in highway construction and maintenance goes back over twenty five years and we now have a complete range of products developed specifically for use in this technically demanding application.

Technical support is provided by our trained and experienced staff, many of whom are Chartered Civil Engineers. This extensive support extends to full design, design validation, feasibility studies, cost advice and advice on meeting regulatory requirements.

Part of this technical support includes developing and driving knowledge within our active markets including working with both international and local regulatory bodies on developing guidance and best practice in the use of innovative geosynthetics to solve complex engineering issues.



Abweb installed on woodland access road.

This literature together with technical data, specifications, design guidance, technical advice, installation instructions or product samples can be obtained by contacting ABG Ltd. All information supplied in this brochure is supplied in good faith and without charge to enable a reasonable assessment of the practical performance of our products. Final determination of the suitability of information or material for the use contemplated and the manner of the use is the sole responsibility of the user. As design and installation is beyond our control (unless specifically requested) no warranty is given or implied and the information does not form part of any contract. The right is reserved to update the information at any time without prior notice. © 2013 ABG Ltd

abg | creative
geosynthetic
engineering

abg Ltd. E7 Meltham Mills Road, Meltham, Holmfirth, HD9 4DS, United Kingdom
t +44 (0)1484 354817 e highways@abgltd.com Registered in England No. 2274509
www.abgltd.com



Cert 570
ISO 9001