

Kevin Hancock
reports

The solutions people

Against a backdrop of increasing demands placed on the railway network, Burdens Rail provides a sustainable supply chain to support this key part of our nation's infrastructure. The starting point is over 80 years experience in providing products and services to benefit construction programmes and the environment. Furthermore, the company's product range is uniquely configured to the needs of our industry, offering solutions in permanent way, embankments and structures, stations and car parks, maintenance and safety, logistics and environmental.

Understanding the challenges of both the civil engineering and physical requirements of railway construction are central to Burdens Rail's unique approach. The supply chain operates throughout the life cycle of our infrastructure - from design and construction to operation and maintenance - and is further supported by 50 strategically located distribution depots.

Over the years, our long-term business within rail has grown as a result of working in partnership with Network Rail track engineers, consultants and contractors to provide the permanent way with what's needed, when it's needed and where it's needed. In recent years, the company has become established as the major supplier of geosynthetics and drainage materials - 'geosynthetics' being the general term for all synthetic layers included in the trackbed either to enhance the properties of, or replace, a granular layer. The term covers geotextiles, geomembranes, geocomposites, geogrids and geosands.

Then and now

It is important to understand that the use of geosynthetics in rail construction, and geotextiles in particular, has been a practice for over 25 years. Terram 4000, now PW1, began life in the early days of British Rail and was used nationally as a filter/separator between ballast and subgrade. Over this period, opinions varied on the effectiveness of a separator at both ends of the performance scale.

At the time, little attention was paid to ground investigation and soils and, with little geotextile choice, T4000 was most commonly used. Over a fine subgrade soil with cohesive content, the apparent pore size of Terram 4000 is 0.085mm and the clay particle size could be anything down to 0.002mm so that the fines would freely pump up through the geotextile into the ballast, suggesting correctly that the geotextile had failed. But where it was used over granular subsoil with particle sizes >0.85mm, it performed effectively as a separator and prolonged the life of the trackbed. It is therefore not surprising that there was a varied response to early geotextile effectiveness.

Today, the ground investigation element provides the main criterion along with other data such as GRP information to determine the selection of suitable trackbed formation treatments in accordance with NR/SP/TRK/9039 and associated components including geosynthetics. And, working alongside track engineers, manufacturers have become more in tune with progressive track geometry and created new geosynthetic solutions.

Development and innovation are areas continually referred to as unnecessary evils, generally because of their drain on resources and funds. However they are easily some of the most important areas as they are the catalyst for taking track engineering forward and providing longevity in maintenance and track life. Burdens Rail is heavily involved in a number of development programmes to make track life more cost-effective.

GEOSAND has recently been developed to allow a consistent yet thinner layer of blanketing sand to be contained within its structure in a roll form, providing a way of creating an effective pumping barrier layer



over any undulating surface. Following extensive testing at universities and on the operational railway, the product has been approved for use across the UK network and has been installed at more than 50 sites.

A roll of Geosand is installed using a roadtrailer.

The importance of innovation

Over the past year, Network Rail has also trialled a new ditch-lining material suggested by Burdens Rail. Originally designed to protect soldiers in Afghanistan, 'concrete cloth' has since been used on a number of track drainage projects with more planned. Supplied in rolls, it behaves like a thick carpet and can be unrolled in lengths up to 200m. When sprayed with water, it sets rapidly and hardens to 80% strength within 24 hours, becoming a robust, durable, waterproof concrete surface with a design life of over 25 years. Quick to install in all weathers on any surface or slope, it is economical because of its ease to use, time saved and long-lasting high wear resistance.

Innovation is critically important across all areas and drainage is no exception. Burdens Drainage Catch Pit system uses the STAKKAbOX™ Ultima access chamber, a system that is strong, structural and easily meets manual handling requirements.

(Left) 'Concrete cloth' has been used on a number of track drainage projects.



(Right) Burdens Rail's collection of insulated tools.

Approved by Network Rail in clear opening sizes of 1200x600mm and 1160x380mm, they have been designed for use in the six-foot and other restricted parts of the track. The system offers significant economies in money and time - for example, a two-man team unfamiliar with the product installed a catch pit in 18 minutes. Shorter possessions are required and there is no need for any specialist labour or equipment. Each component section weighs less than 25kg, meeting UK manual-handling requirements.

The STAKKAbox™ Ultima's sidewall and vertical loading capability is equivalent to concrete and the AX-S Composite Cover is certified to take a load of 12.5 tonnes. Once installed, the cover is non-conductive, non-slip and non-corrosive whilst the phenolic grating option is also non-slip.

The STAKKAbox™ Ultima catch pit system.



Embankment products

Over the past few years, Network Rail has been tackling the legacy of Victorian and neglected embankments. Burdens, through its sister companies WTB Geotechnics and Enviromesh, has played a key part in this challenge.

WTB Geotechnics offers a range of geosynthetic solutions including -

- **Azweb** - a lightweight expandable cellular confinement system that creates an erosion barrier or structural foundation.
- **Tensarmat/Trintermat** - typically used on slopes up to 40°, providing a three-dimensional structure for the confinement of soils.
- **Biodegradable erosion control** - a range of biodegradable products to provide long-term protection and permanent turf reinforcement. They are available seeded or unseeded and can also be supplied fire-retardant.
- **Gabions and mattresses** - welded or woven, these are available in a range of standard and bespoke unit sizes to suit applications from mass gravity retaining walls to free-standing acoustic barriers.

Platform copings are also supplied by Burdens Rail.



All are BBA-certified and backed by a free in-house desktop design service.

- **Enviromesh block wall** - this is an innovative concrete block facing with textured finish that is secured externally to the gabion face, giving the appearance of a natural rock face with no visible mesh wires.
- **Rockfall protection** - a hexagonal woven wire mesh that can follow the contours of the embankment/rock face.
- **Rabbit/badger netting** - this offers a low-cost and effective solution to the destruction of embankments, preventing damage and economic loss.

Extensive catalogue

The challenges of today's rail construction projects are not limited to the permanent way alone and require integration with other modes of travel. Adequate parking arrangements for those starting their journey by car, storage for those travelling by bicycle as well as links with buses and other forms of public transport are critical to the effectiveness of the rail network.

Large car parking areas create issues of surfacing and dealing with water run-off. Burdens Rail offers sustainable modular drainage systems using permeable concrete block-paved surfaces together with high void-ratio storage and infiltration blocks - proven systems that also incorporate Hydrobrake devices to control flows from storage into outlets.

Pedestrian safety and customer satisfaction are enhanced through a range of environmental street furniture that includes seating, litter bins, tree grilles, signage, exterior lighting, cycle racks and bollards. These are all part of solutions that also include platform copings, edge warning paving and oversail blocks. In addition, there is a comprehensive range of access units, pole chambers and ducting systems that provide access to lighting and the all-important communications cable networks.

With over 3.3 million passengers using our railways everyday, safety and on-going maintenance are major issues. Burdens supports health and safety demands internally within the business and delivers the same service to Network Rail sites, ensuring that all current safety legislation is met. High visibility workwear that meets industry specifications, along with

appropriate footwear and PPE, is stocked as are high quality track tools for areas with live electrical systems. Permanent, temporary and hazard warning fencing are also available from stock, along with a wide range of hand and power tools, surveying and measuring equipment.

Burdens' rail catalogue includes construction chemicals to assist in problems associated with waterproofing, curing, coatings, levelling, dustproofing and sealing. Lubricants and adhesives form part of the range too, for use with plate/slide chair mechanisms, clamp lock point mechanisms, and in-track and rail lubrication.

Care for the environment

The wide-ranging experience of Burdens Rail in environmental issues associated with water, energy and waste provides an extensive problem-solving support network for the construction of buildings, employing natural insulation materials that perform in harmony with nature and are unaffected by moisture, breathable and simple to install. There are also lime mortars and heritage rainwater systems to protect and enhance the legacy of the existing infrastructure.

Creating new buildings allows a 'greening' of locations, minimising surface water run-off and urban overheating by means of green walling and green roof solutions that complement the already comprehensive sustainable drainage products on offer. Large areas of surface water collection provide an opportunity for capturing and reusing this valuable resource through a range of commercial rainwater harvesting systems.

Burdens Rail is committed to the minimisation of waste in all of its activities and actions. Indeed, the company strives to be the industry leader in providing materials and services for the three areas of infrastructure, construction and the environment. These efforts, innovation and resources are now focussed across all sectors of the industry and have been assembled in an 84-page brochure entitled 'Rail products and services', providing more details and useful information to help all involved in our industry. ■

Kevin Hancock is Geosand's corporate development director.