Rail Capability
From the Chairman

Geotechnics and Site Investigations for Railways

The investigation of ground conditions relevant to the maintenance or upgrading of rail assets has been a key element in the service which Geotechnics provides for over a quarter of a century. It requires a special commitment to working within the constraints imposed by a working rail system, often overnight at weekends in a very limited time frame in confined sites at locations which are often remote from the point of access for plant and equipment. Furthermore the weather conditions at the pre-determined time required by the programme cannot be selected so that they have to be accommodated.

Collaborative working, where Geotechnics’ expertise can be combined with that of its clients within the constraints which have been outlined, is essential to success in such an environment and this fits well into Geotechnics’ policies and strategic objectives. The Company has systems and a team of Engineers and Technicians with a great deal of experience and up-to date certification in safety procedures which are subject to annual audit under the Achilles Link Up scheme, consistently achieving high grades for its work.

Drawing on its experience we are frequently able to provide guidance on efficient, practical and safe ways to achieve the objectives of the designers and we have custom built equipment available for use where necessary. Notable projects completed include work on the West Coast mainline upgrade, work on the Evergreen 3 London to Birmingham improvements project, on CrossRail at Plumstead and at Tebay. Regular smaller scale projects are part of our monthly work load. Each of its offices can call on trained and capable staff which can be made available in any of the regions as needs arise.

Clients can be confident that by commissioning Geotechnics to do their work they will be employing one of the UK’s leading specialists.

Len Threadgold
Chairman – Geotechnics Limited
Geotechnics Limited was established in 1983 to provide the full spectrum of services covering the design, implementation, interpretation and evaluation of geotechnical and contaminated land site investigations. Our head office and laboratory are based in Coventry, with additional offices in Chester, Exeter and Yorkshire.

Our Directors are industry leading RoGEP Advisers, and the majority of our staff are professionally qualified, many of which hold Geotechnical Advisor status. Company-wide we can call on a knowledge base with a vast range and depth of experience in Geotechnics, Engineering Geology and Contaminated Land. We have over 30 years’ experience within the UK rail sector and we have highly experienced PTS qualified staff across all four of our offices.

Our success is based on our innovative approach, supported by the knowledge and experience of our staff, and the ability to provide integrated, appropriate solutions to meet our Clients’ needs.

Geotechnics Limited holds certificates from Constructionline and Link-Up certifying that our organisation is approved and listed on the UK Register of Qualified Construction Services and for Railway work respectively. We are Quality Assured to BS EN ISO 9001:2008 and ISO 14001:2004, and UKAS accredited for over 50 Geotechnical tests at our in-house laboratory in Coventry.
Meet the team

Terry Clark
Commercial Manager
With over 40 years’ experience in site investigation, Terry has gained extensive knowledge. As Commercial Manager he has successfully managed large, complex rail site investigations for schemes such as the West Coast Mainline upgrade, Nuneaton Station Improvements, Railtrack Boundary Survey, Evergreen 3 upgrades and CrossRail.

Steve Miller
Senior Estimator
Steve has over 12 years’ experience within the site investigation industry with responsibility for pricing and planning rail project tenders. He has been involved with notable large scale projects including various packages for the CrossRail project and the Midland Mainline Electrification project.

Neil Yates
Rail Geotechnical Project Manager
Neil has over ten years’ experience of site investigation, five of which are in the UK rail industry. He has considerable experience as a Geotechnical Engineer in both the designer and contractor roles and has undertaken the programme management of multiple rail projects and project management of large scale site investigations for schemes such as the Midland Mainline Electrification project, and East West Rail Phase 1.

Andy Suominen
Rail Geotechnical Project Manager & Staff Co-ordinator
With over ten years’ rail experience, Andy undertakes both a Project Management and Rail Staff Co-ordinator role within the company, ensuring that all rail trained staff companywide meet the required level of competency and are working in accordance with the most up-to-date industry requirements. He has gained experience not only in the Project Management of large scale site investigations for schemes such as Rugby Re-signalling, Midland Mainline Electrification project, CrossRail and the Nottingham Hub, but has also been involved with the production of Work Package Plans, Task Briefings and Risk Assessments.

Rob Webster
Rail Geotechnical Project Manager
Rob has seven years’ rail experience of site investigation, working initially as a Site Engineer, progressing to Project Manager. He has considerable experience of planning and implementing both straightforward and highly complex site investigation works within the rail environment, and has been instrumental in successfully addressing challenges of difficult access and specialist instrumentation. Key projects include the Kettering to Corby line, Evergreen 3 and CrossRail.

Ian Boyle
Rail Geotechnical Plant Co-ordinator & Senior Site Supervisor
Ian has thirty years’ experience of site investigation in the UK rail industry, starting out as a laboratory technician and progressing to Contracts Manager and then Senior Field Technician. During his career he has gained considerable experience in the field management of rail site investigations, and has gained a substantial knowledge of all field activities, including in-situ monitoring, testing, and both the logistics and mechanics of rail specific investigation plant.

Dave Cage
Business Development Engineer
With over ten years’ experience Dave has specified and undertaken the project management of large scale site investigations for schemes such as the West Coast Power Supply Upgrades, Evergreen 3, and East West Rail Phase 1. During his career he has gained additional experience in the production and approval of Construction Phase Plans, and rail specific geotechnical asset management (principal and secondary inspections).

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Where are we?

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Based in Coventry, Geotechnics Limited has its own in-house UKAS accredited laboratory which provides geotechnical testing in conjunction with, or independently of the investigation and specialist advisory services.

Strength and compressibility data together with soil classification and grading are required for foundation design whilst potential aggression to concrete can be determined from chemical analysis.

Investigation of sites which slope, or where slopes are to be formed, requires the measurement of long term soil behaviour. For roads and earthworks, the suitability of soils for use in embankments needs to be assessed, together with subgrade characteristics for road pavement design.

We also work closely with partner organisations to offer chemical contamination testing for a wide range of determinands.

A total of some 50 accredited tests include:-

- Triaxial
- Shear Box
- Particle Size Distribution
- Index Property
- CBR
- Chemical Analysis
- Rock Strength
- Shear Box
- Consolidation
- Compaction
- MCV
- Lime/soil interaction
- Density

Geotechnics Limited is staffed by qualified professionals with a vast range and depth of experience in Geotechnics, Engineering Geology and the Geoenvironment. Many of these have Geotechnical Adviser Status, and the Company is led by Directors who hold Advisor status under ROGEP (the UK Register of Ground Engineering Professionals).

Such expertise is available to Clients from project inception to completion and beyond through each of the Company’s offices in Coventry, Chester, Exeter and Yorkshire. This continuity is the key to maximising the benefits which are available to Clients in terms of commitment, planning, risk management, safety and economic construction.

One of the most valuable early services, sometimes before commitment to site purchase, is the Site Reconnaissance and Desk Study phase when available data is reviewed and interpreted in the context of potential site development proposals. Subject to a Client’s continuing interest in the site, the best means of investigation can be devised based on the data already obtained and taking account of the Company’s knowledge of the capabilities and constraints of the techniques available to the industry, as well as geotechnical and geoenvironmental objectives.

Such work is best done in phases, integrating the evolving requirements of the project team to ensure appropriate and cost effective investigation and design.

The Company’s engineers work with developers, consultants and contractors to provide the expertise required to solve the site’s Geotechnical and Geoenvironmental problems.

- Identify critical Geotechnical and Geoenvironmental issues at project inception.
- Undertake Desk Study and Site Reconnaissance.
- Design and Supervise appropriate phases of investigation as data emerges and design evolves.
- Schedule and review Laboratory Testing appropriate to the proposed development.
- Advise design team of Geotechnical and Geoenvironmental issues and possible solutions.
- Liaise with those with a third party interest in schemes.
- Design remedial works.
- Check geotechnical aspects of designs.
- Observe, record and respond to ground conditions during construction.
- Monitor ground/foundation performance during and after construction.
- Report on design, observations, records and outcomes.
Sensitive Slope Stabilisation

The historic Daniels Mill to the South of Bridgnorth in Shropshire was hit by the twin disasters of flooding and landslip during extreme rainfall in the area during the summer of 2007. These problems were intimately associated with those of the adjacent Severn Valley Railway which passes to the west of the site on a viaduct over the valley of the stream which serves the mill. This sensitive earthworks project was conceived and directed by Geotechnics Ltd to protect this famous Mill and maintain support to the viaduct abutment.

The landslip impacted on one of the outbuildings and stabilisation works were required to address both the slope behind the building and the slopes and buttress associated with the viaduct. The mill is sited in a heritage and conservation area and therefore required innovative and sensitive re-mediation to recognise the historic environment, access constraints, sustainability issues and the maintenance of stability to the viaduct throughout the construction. Reinforced Soil was seen as providing the optimum solution.

Specialist environmental contractor, WM Longreach, was appointed to carry out the complex stabilisation works. Due to the access constraints, their solution was to use a long reach excavator for the slope reconstruction, provided from their own long reach plant business, WM Plant Hire Ltd. The machine to be used was selected by Damian McGettrick following his site meeting with Len Threadgold. This was fitted with a tilting bucket attachment and was able to sit in one location to remove the failed material and subsequently place the new fill material in layers. Over 2000 tonnes of material had to be excavated from the failed slope profile, replaced with a structural stone fill reinforced with Heusker geogrid materials and compacted to a high specification. A small excavator was used to level the stone prior to compaction and, using a tensioning system, the geogrid was tightened over each layer to form the new steep slope profile. Topsoil was wrapped in a finer geotextile at the slope face to allow successful vegetation growth through hydrosheeting. The upper slope was repaved and dressed in a coir matting to prevent short term erosion during the winter months and facilitate the subsequent establishment of the grass and vegetation in this area. A feature wall, dressed in Wenlock stone, was at the base of the slope to blend in with the mill.

Water from behind the filling and the base of the new slope feature was drained to an outfall downstream of the Mill and the driveway and car parking areas were resurfaced to provide a high quality appearance to the finished works. The Mill owners were delighted with the end result and were complimentary of the attitude, commitment and conscientious approach of the project team in achieving a successful outcome to what was a very challenging and high profile project, with disruption kept to a minimum, despite being done during one of the most severe winters on record.

This work was recognized by the Institution of Civil Engineers West Midlands Region who presented the team with the Geotechnical Award for 2010 at their recent Awards Dinner.
Balfour Beatty Rail (BBR) invited Geotechnics Limited to tender for ground investigation works for the new Crossrail lines from Plumstead to Abbey Wood in South East London. Balfour Beatty, who are working for Network Rail, are designing relocation of the existing up and down North Kent Lines (NKL) to create a corridor for Crossrail lines from the Plumstead Portal to beyond Abbey Wood Station. The works will require the widening of the existing embankment and track corridor to accommodate the extra lines and associated equipment.

The investigation was to comprise Cable Percussive boreholes, piezocone CPT's, with pore pressure dissipation testing, Window Sample boreholes and Inspection Pits/Trenches. Most of the work was trackside and to be undertaken in weekday night or weekend possessions. Geotechnics Limited opted to use the extended weekend possessions as those on weekday nights afforded only very short working times.

BBR awarded the contract to Geotechnics and following a number of meetings and extensive communications a programme of work was agreed, commencing with a 51 hour possession over a three day period in March 2012, followed by normal weekday work on non-trackside exploratory holes up until Easter 2012, when another extended possession was available. Geotechnics team was headed by Andy Suominen and Ian Boyle, ably supported on site by Steve Chapman, Nick Tarrant, Lawrence Page and Leigh James, drill crews and specialist sub-contractors. A variety of road/rail plant was mobilised for the weekend possession including excavators, trailers, CPT track-truck and track trolleys.

Problems with Possessions and access gave rise to an amended scope of work and exploratory hole relocation. Window sampling was undertaken along both sides of the track at the western end of the site; in the CESS within protected green zone on the south side and in the Crossrail compound on the north. Five boreholes were drilled using standard cable percussion techniques but two required the use of a modular cable percussive rig in a protected green zone. Two further trackside boreholes were drilled using Window Sample techniques and in four of the boreholes standpipe piezometers were installed to allow monitoring of water levels post-installation. Ground conditions were shown to be variable with Made Ground and Alluvium, including peat, being encountered over medium dense to very dense granular deposits.

Over an Easter weekend a CPT track truck undertook 9 CPT’s in the Four Foot between the rails whilst a further 2 tests were undertaken in the CESS from a road/rail mounted unit. The final test was undertaken using the truck in the Crossrail Compound. For a number of the tests a Magcone (CPT with magnetometer fitted) was used to sense the possible presence of Unexploded Ordnance (UXO) as the work progressed.

Following the successful completion of site work and a programme of geotechnical and Geoenvironmental testing, a factual report was prepared and submitted to BBR. We were very proud to subsequently receive a letter of praise from the Client!

The success of such logistically demanding projects depends upon the skill, experience and teamwork of all parties giving rise to good working relationships and flexibility on site to make sure that no one gets their lines crossed and the work gets done.
Yorkshire Geotechnics
Our new team in the North East

We are proud to announce the opening of our new Yorkshire office in Sherburn-in-Elmet between Leeds and York. Serving the North East, Humberside and the Yorkshire area, the office is staffed by an experienced, already regionally well-established team of geotechnical engineers and technicians.

The Yorkshire team have considerable experience within many different sectors and have formerly been included on many large national and regional frameworks together with large “one off” projects, on which they have utilised their wealth of knowledge and experience. Amongst other areas, they hold experience in installing specialist monitoring systems including inclinometers, divers, vibrating wire piezometers and in-situ testing including CBR, DCP and Mexeprobe. The team has in-house dynamic sampling capability with a rig fitted with a concrete core attachment and chalwyn valves/spark arrestors for work in explosive atmospheres.

If you’d like to find out more about our new Yorkshire office and find out what our team has to offer, please get in touch with Adrian Stevens, our North-East Regional Manager, on 01977 525032, or email him at astevens@geotechnics.co.uk.

Laboratory investment
Our new effective stress equipment

Geotechnics Limited has been operating a geotechnical laboratory at our head office in Coventry for over 30 years. UKAS accredited for over 50 Geotechnical tests, we have strived to maintain a high standard of quality and develop our laboratory capabilities to meet our client’s needs. We even open our laboratory to our clients to provide training in the various laboratory testing techniques, and conduct tours for key clients as required; last year we provided a tour of our laboratory to staff from Network Rail!

We have recently invested further in our laboratory services, expanding the scope of testing we offer with three fully automated effective stress testing systems. We are one of only a few laboratories to offer this state of the art equipment, enabling the testing of samples 24 hours a day, reducing the test duration of a standard manual test by around a third.
West Cumbria Raw Water Aqueduct
A large scale, challenging linear site investigation

Site Investigation work is now on, and in, the ground for United Utilities’ new major project to connect Thirlmere reservoir to West Cumbria. The exact route of the pipeline – which will transfer water mainly by gravity – is still being finalised, but once completed it will be able to supply water to 80,000 people and businesses in Allerdale and Copeland via an estimated 96km length pipeline.

Geotechnics Limited are excited to have been selected for the first phase of works and are currently undertaking intrusive investigations utilising various techniques such as trial pitting, cable percussion, and rotary and sonic coring around the town of Keswick. The scheme poses considerable challenges in terms of scale, remote working, working within an Area of Outstanding Natural Beauty, local infrastructure, varied geology and difficult drilling, and considerable stakeholder engagement.

For more about United Utilities’ proposed pipeline route and the latest public consultation please visit www.unitedutilities.com/west-cumbria. For more information on Geotechnics’ collaborative approach, investigation techniques, and our management strategy for such large scale complex site investigation schemes, please get in touch.

Get in touch with our Chester office on 01244 671 117 or email mail@chester.geotechnics.co.uk

The fully automated systems mean that we are now able to offer testing under drained or undrained conditions testing with cell pressures to 2000kPa on specimens from 38mm to 100mm in diameter.

For more information please get in touch.