

UNDERCOVER



news in the pipeline

Welcome to the launch edition of 'Under Cover'. We are Perco - the people who excel underground to deliver cost effective pipe and cable engineering solutions. We hope you enjoy our newsletter, as we aim to keep you regularly informed about what we are 'up to down there'.



PERCO MAKES THE RIGHT MOVES!

When it comes to house building and development, Perco has a new solution that is taking all the hassle out of service connections, using laser guided technology. Find out on Page 3 why our services are in demand across the UK in the housing sector.

Pulling into INFRARAIL 2003!

STAND 558, MANCHESTER G-MEX, 16-18 SEPTEMBER



Railway engineers are increasingly turning to technology that lets them upgrade facilities without stopping rail traffic. Perco's approach - and the main theme of our show at the 3-day Infrarail exhibition in September - is about civil engineering that not only keeps trains running but does not even require speed restrictions.

Perco has long been involved in engineering works for drainage, cabling and other infrastructure systems on the rail network and we are at the UK forefront in auger boring - a technique with immense advantages for the rail sector. This technique excels particularly when tunnelling underneath the tracks, as it causes minimum disturbance to the ground and can operate from compact launch shafts.

"For Perco, Infrarail is an ideal opportunity to let the industry know that we are operating at the sharp end of trenchless technology and repeatedly delivering these engineering solutions, safely and economically. Few yet realise that we were the first contractor in the UK to install under-track crossings under high speed lines, without speed restrictions, using optically-guided auger boring."

- Gary Houghton, Director.



A Bohrtec BM400 auger machine will form the centrepiece of our stand at Infrarail. Our senior no-dig specialists, Gary Houghton and Nick Sheehan will also be on hand to explain how our auger boring system has already been slashing possession time on projects such as the West Coast Main Line, Watford & Bletchley remodelling. On this project, Perco installed 13 under-track crossings (UTX) for cabling, while trains operated at speeds up to 110mph (see the full story, back page).

DIRECTIONAL DRILLING - a new angle for Perco

WE COULD HARDLY WAIT TO UN-CRATE OUR NEW AMERICAN AUGERS DRILLING RIG, GIVEN THAT HORIZONTAL DIRECTIONAL DRILLING IS SUCH AN IDEAL ADDITION TO OUR GROWING RANGE OF INDIVIDUAL SERVICES. THE MACHINE HAS JUST BEEN COMMISSIONED AND REPRESENTS THE FIRST MAJOR PIECE OF HARDWARE FOR THE PERCO DIRECTIONAL DRILLING DIVISION.

Now a widely used method for the installation of plastic gas and water pipes or TV, electricity and telephone cables below ground, directional drilling is well established in the UK and there are many contractors already operating at the small bore end of the market. We 'thought big' and chose to focus upon the larger diameter installations, where our current expertise lies.

"This new division will enable Perco to become the leading single source supplier for all types of trenchless pipeline installations"

Nick Sheehan.

WHAT IS DIRECTIONAL DRILLING?

In essence directional drilling is a steerable method for installing pipes, conduits and cables, usually in a shallow arc, using a surface-launched drilling rig. More precisely it involves large scale crossings in which a fluid filled pilot bore is first drilled without rotating the drill string. This is then enlarged by a washover pipe, which follows just behind the cutting head. When the drill emerges at the exit zone, the cutting head is exchanged for a back reamer, which removes more material as the drill string is withdrawn, and the new pipeline is towed into position.

It is termed a directional technique because the pilot bore is guided to a required deviation as drilling proceeds. This is done by positioning an off-setting device called a bent sub at the cutting head. The drill string is tracked by using a downhole survey tool, or by a transmitter in the drill head. To produce a straight horizontal bore, the slanted drill head is constantly rotated and simultaneously pushed forward. When a curved bore is required, hydraulic thrust alone is used, with the drill head remaining static.

The American Augers DD-6

Perco's latest item of equipment represents a huge investment in plant and operating capability. Produced by the world's leading manufacturer of directional drilling tools, American Augers, the compact DD-6 weighs over 10 tonnes and measures 7.6m in length. It is a self-propelled unit, producing over 13,500Nm maximum drilling torque and 267kN of thrust or pullback force, enabling it to handle large bore lengths and diameters.



Kew Calls in Special Branch

A major sewer replacement project at the Royal Botanic Gardens, Kew, was virtually undetectable to the visiting public, due to the careful use of trenchless technology by Perco engineers earlier this year.



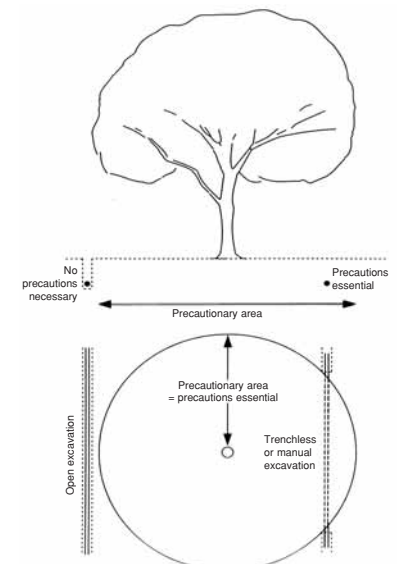
This 200 year old Indian Chestnut was left undisturbed as a 45m pipe burst was installed from the manhole.

The installation of 160m of 225mm diameter pipe was part of a project to expand public facilities in the gardens this year. It was essential to avoid damage to tree root systems and, while guaranteeing tree safety, the Perco solution had the added advantage of using only existing manholes for access. Other tendering contractors required the excavation of large launch and recovery pits for their pipe bursting rigs.

Working from Kew Gardens' 1.2m x 1.0m brick manholes, the Perco team employed their Expandit pipe bursting technique. This involves jacking a powerful expanding mole through the existing pipe, which it bursts and compresses into the surrounding soil. Short Snap-it pipes, at the new, larger diameter, are jacked into the resulting annulus. The sewer runs adjacent to The Broadwalk, which is the main road in the gardens, and passes outside the main gates, where it joins the public sewer. Consequently, the upsizing work could potentially have disrupted local residents and visitors alike. Using the Expandit system ensured that disruption was completely avoided, to the extent that the opening of Aroid House by HRH The Prince of Wales took place undisturbed as work was underway.

Mr John Hargrave, Building Supervising Officer at Kew, commented: "The gardens are open to the public 363 days per year, so we do not have the ideal conditions in which to undertake this type of engineering work. Although I was previously unaware of the technique used, it proved to be the perfect solution, executed safely and expertly by the Perco team under difficult access and weather conditions. The work was completed within the programme and budget."

At all times Perco worked to the guidelines issued by the National Joint Utilities Group concerning the installation and maintenance of services close to trees. This defines a precautionary zone around the tree, the diameter of which is proportional to trunk girth. Only trenchless work or manual excavation is recommended within the zone.



Guidelines for the installation and maintenance of services close to trees (National Joint Utilities Group).





STEVE DIRECTS DD OPS

We are very pleased to announce that Steve Watts joined the company in August as Operations Director of Perco's Directional Drilling Division.

Steve has spent 12 years in directional drilling and has even longer experience in the industry as a whole.

Working for a broad variety of contractors in the UK, latterly based in Bedford with the Directional Drilling Company, he has concentrated on the complex area of larger diameter drilling - a specialist skill that underlines Perco's expertise and ambition in trenchless techniques.

The newest member of the Perco team is not only at home managing drilling operations but has also proved his aptitude in a sales role. One of Steve's key objectives is to establish

awareness of the Directional Drilling Division, extending Perco activities into new fields of application.

Commenting on his appointment, Steve said:

"I am very enthusiastic about the move to Perco. After many years of consolidating my skills within this sector, they have provided an opportunity to develop a drilling division that perfectly complements the balance of the current portfolio. With the purchase of the American Augers DD-6 machine, together with an environmentally friendly recycling plant, our presence in the horizontal directional drilling market will be felt very quickly".

HOUSING - 'Laser guided' sewer link up

Connecting housing developments to the main sewers by excavating for pipes is usually extremely disruptive for the local community and traffic. Realising this can be a serious problem, particularly as more new housing adopts brownfield sites in urban areas, Perco has introduced the latest tunnel boring technology to cut out the need for trenches.

This approach gets the job done efficiently underground, without disrupting life on the surface. What's more, it is an extremely accurate process. The technique used is auger boring, which first cuts a hole to receive the pipe and then installs the pipe, section by section. Laser guidance keeps the system exactly on track between connection points.

Two recent projects in the Midlands show how the new method has helped house builders eliminate the impact of making final sewer connections.

Reaching the final stages of a city-centre development in Derby, Wheeldon Homes

preserved good relations with pedestrians and road users by taking this non-disruptive approach. Perco discussed with Severn Trent Water a trenchless solution, which took into account the proximity of a nearby railway station, major roads and footpaths. This involved sinking a permanent narrow shaft, which would remain to serve as a manhole, following auger boring and installation of a 150mm clayware sewer pipe. The entire work took just three days to complete.

At an Albury Housing site in West Haddon, Northants, local businesses, as well as the general public, would have suffered as a result of open cut sewer installation. The consulting engineers were also aware of the ensuing traffic management problems. Not only did Perco's solution successfully connect the housing project to the surface water and foul water drains but it also coped with restricted access and difficult ground conditions. A 2m diameter launch shaft was excavated, from which 150mm and 225mm pipes were installed over distances exceeding 50m.



KOREA TAKEOFF FOR NICK

Asia's environmental issues came under the spotlight in June when the South Korean capital, Seoul, played host to ENVEX 2003. Representing UK leaders in environmental technology, Perco director Nick Sheehan flew out to deliver a highly-praised presentation on pipe bursting techniques to a seminar audience of engineers, government and trade officials.

Nick was invited to take a leading role by JEMU, the Department of Trade and Industry's Joint Environmental Markets Unit. The seminar focussed on UK innovation in sewerage works and systems, with a session dedicated to rehabilitation projects - a key area of activity for Perco.

Explaining how pipe bursting is used today in sewerage pipe rehabilitation, Nick began with the British origins of the technique in gas mains replacement in the late 1980's and took the subject through to today's advanced hydraulic Expandit method. This is Perco's Number One pipe bursting technique, specifically designed for sewer renovation. It has many crucial advantages over the older, pneumatic method, which requires noisy compressors and can cause damage to buried services through vibration.

Nick's presentation struck a chord with members of the seminar audience, who were keen to hear about the exceptionally low environmental impact of the Expandit method. They were particularly impressed by the fact that no excavation is necessary, working from manhole to manhole with a high degree of operator control.

"With over 10,000km of sewers to rehabilitate there is a significant work load for the right technology over there," Nick comments, "We are currently nearing completion of a partnering deal with a local Korean contractor to supply the Expandit system."



Nick Sheehan

RAIL - West Coast Main Line UTX by guided augerbore

Perco's large-bore trenchless tunnelling procedure, using compact launch shafts, has overcome track possession restrictions to install cable ducts on the Watford & Bletchley remodelling project (West Coast Main Line). A team of Perco engineers worked with Balfour Beatty Rail Projects to complete the task while trains operated at speeds up to 110mph.

Our team installed 13 under-track crossings by optically guided augerboring, while the main contractor monitored constantly for any track movement. The work was completed successfully to schedule, averting the need to rely on track possessions.

As Andrew Strong, UTX Project Engineer with Balfour Beatty, explains, an alternative to traditional construction methods was considered necessary:

"With so many crossings to install, the conventional open cut method had unacceptable possession implications. One of the alternative options we considered was pipe ramming, which would have required space for pipe and jacking equipment at the trackside. No land-take was available to create the space needed and guided augerboring, from vertical launch shafts and with precise direction control, proved to be an ideal solution. Another great advantage of the augerboring method is that long term settlement in the trackbed was negated. This would have been extremely difficult to overcome in the case of a back-filled trench. With Perco we finished the work both to programme and to the client's satisfaction."

Perco is unique in offering trenchless installation of large diameter ducts from small launch shafts. In this case two Bohrtec machines were used, capable of installing steel sleeves up



to 1m diameter. Working from a 2.13m diameter shaft constructed by the Watford & Bletchley Alliance, the BM400 auger installed 457mm diameter sleeves, in order to house six 150mm ducts. The larger BM500 auger worked from 3.2m shafts, again constructed by the Alliance, and installed 750mm sleeves, to house twelve 150mm ducts. All the cabling ducts were later fitted by slip lining.

Wherever possible the crossings were bored with only 2m of cover. This reduced the installation time for the launch shafts but required constant track monitoring as a safety precaution. A strict limit of ± 6 mm movement was imposed in relation to heave and settlement, and twist and cant.

The work was accomplished to specification, without delaying the contract, or the cable layers. Balfour Beatty was able to place and recover the auger equipment during possessions allotted to other engineering operations.

Watford & Bletchley Alliance Design Engineer, John Hillary, adds:

"We had allowed for settlement of 10 to 15mm during the augerboring. Remarkably the

highest settlement recorded at rail level was only 3mm, so that Perco's system more than proved its non-intrusive capability. All the crossings were cut successfully through mixed ground -ash, silty-clays and gravels - outside of possessions. Particularly when used in multiple boring operations on major routes with prohibitive possession start-up costs this technique is worth its weight in gold."



OUR SERVICES

- Pipe bursting
- Augerboring
- Microtunnelling
- Directional drilling
- Sliplining
- Pigging
- Shafts and headings
- CCTV

...AND PRODUCTS

- Expandit system
- Snapit segmental PE pipe system up to 1000mm

DON'T STOP THE TRAINS!

Perco install UTX's whilst rail services operate at normal speeds. This allows continuous working, shorter project completion times and lower installation costs.

For the rail operations using laser guided augerboring techniques, Perco can operate to settlement tolerances at rail level of down to 3mm.

For more information or to discuss a project, call Nick Sheehan
 01604 590200
 01604 590201
 www.perco.co.uk/rail

Catch the new rail ad...

We are confident that we have plenty to shout about when it comes to underground engineering. One of our latest advertisements focusses on pioneering work in trenchless technology for the rail industry and will be appearing in the rail engineering press soon.



For more information about Perco:

PERCO Engineering Services Ltd
 Cornhill Close, Lodge Farm Industrial Estate, Northampton NN5 7UB U.K.

Tel: +44 (0)1604 590200 Fax: +44 (0)1604 590201 Email: info@perco.co.uk

