THE NEWSLETTER OF PERCO ENGINEERING SERVICES autumn 2005

# UNDERCOVER

**A SERIES OF LATERAL SEWER CONNECTIONS, ACHIEVED BY PERCO AS PART OF THE ENVIRONMENT AGENCY'S FLOOD ALLEVIATION PROJECT FOR LEWES, HAVE SET A UK PRECEDENT IN AUGERBORE TRENCHLESS TECHNOLOGY.**

## A UK FIRST IN AUGERBORING

The augerbore team operated subcontract to Costain B&V JV and worked with Oxford Hydrotechnics to overcome unstable ground conditions, made worse by the high water table in the area.

The contract required four drives, totalling 150m in length, at three locations. At Court Road, the launch points were from a new 1200mm concrete pipe, 13m below ground level and approximately 1.5m below the water table. Perco used a BM150 DT rig to produce a near vertical bore, through the chalk ground, for the lateral drain.

The augerboring rig was lowered via a shaft to the new sewer pipe and moved 40m on rollers to the first launch point. Here, the pipe wall was drilled for resin injection into the surrounding soil and diamond-cut for the augerbore. Even without optical guidance, the accuracy of the drive was perfect.

Perco inserted MDPE pipe in threaded, short lengths, before removing the auger casings and fitting a 45° bend onto the pipe. The process was repeated to install a second lateral connection.

*Perco mud mixing and recycling plant*

## clean as mud

**At Perco, we are always enthusiastic about technology that reduces environmental impact.**

Although drilling needs large quantities of drilling fluid, or mud, requiring delivery and removal, we invest in equipment to mix, recycle and dewater muds on site to the highest practical standards in the UK.

While reducing the quantity of solids for final disposal and returning cleaned water to sewers or water courses, we have also extended our trials of special drilling muds, which biodegrade in landfill.

## BLUE SPLURGE ON THE ROAD

Our vehicle fleet is adopting the new Perco symbol. This will not affect our standards of service on site but it means we will look a lot better on the way there...

*UV lining, Heathrow Airport*

# PIPE REHAB REVIEW

**Perco's range of trenchless rehabilitation techniques covers both pipe renovation and pipe replacement. In some situations one approach can be substituted for the other, with advantages for the client and end-user.**

**So what's the difference?**

### RENOVATION

Essentially, renovation involves preserving the original pipeline to some extent and improving its performance, or longevity. A trenchless example is EcoCIPP relining, in which the GRP liner provides structural support and eliminates problems such as localised corrosion, collapse, or leaking pipe joints. Some renovation techniques, such as coating with epoxy resin, or cement mortar have a relatively short lifespan and combat corrosion only. Others, including close-fit PE lining, can offer structural support but do not maximise the flow capacity of the pipe, or follow sewer contours, as well as EcoCIPP.

### REPLACEMENT

Like renovation, trenchless replacement makes use of the old pipe but differs by completely destroying (bursting) it in the process. In general, pipebursting carries higher costs than relining but it can also upsize the pipeline by a significant amount, if required, in a choice of pipe materials.

The forerunners of Perco's Expandit pipebursting system and shaft-to-shaft rod pulling method were pneumatic, percussive moles. While steerable variants suitable for pipebursting are available, moles now tend to be used for short lengths of small diameter water and gas services, in virgin ground where vibration is not a problem. The beauty of Expandit is that it bursts progressively, using hydraulics, to cut out vibrations that can damage other buried services and surface structures. It can also pull pipe strings behind it, from a launch pit, or short 'Snapit' pipe sections from a manhole.

# No-Digging for BARRATT HOMES

**John Reilly, the main groundworks contractor for Barratt Homes at a former Portsmouth University site, recently called in Perco to create new plastic sewage pipe connections by augerbore.**

Perco first sank four concrete shafts and a manhole. This was followed by four drives ranging from 12 to 34 metres in length, using guided augerboring with a BM400 rig.

Excavation and construction of two additional timber headings was also needed. The first was a roadside reception pit that was put in to receive the augers. The second timber heading was driven out 2.5 metres, enabling Perco engineers to fit a saddle to a main.

As a result of the Milton Campus site location, in an old canal basin, one of the shafts was so waterlogged that it threatened the augerboring operation. To overcome this a new auger drive was directed 47 metres upstream, into an existing manhole.

Steve Batterson, Contract Manager for John Reilly, commented: "Due to the age of the existing sewer system and the heavy traffic in the area, this was always going to be very difficult work. Perco's operation worked out extremely well and was completed in about 12 weeks."

*No-dig means no traffic hold ups, Portsmouth*

*Cliff-top mud plant set up, Harlech*

# PERCO DRILLS SEASIDE ROCK

**USING TRENCHLESS TECHNOLOGY TO INSTALL A 60M PLASTIC PIPELINE THROUGH CLIFFS AT HARLECH, NORTH WALES, PERCO'S DIRECTIONAL DRILLING DIVISION HAS ANSWERED ONE OF ITS TOUGHEST CHALLENGES YET.**

As specialist trenchless contractors, Perco were invited by Galliford Try Construction North to recommend a solution. Rather than disrupt the grounds of a cliff-top guest house by vertical drilling, Perco engineers proposed directional drilling from a corner of a nearby field.

Our Drilling Manager, Steve Watts, advised on the directional drilling procedure and tracking method. He confirmed that the work could be successfully completed within a four-week window, assuming the cliff's composition to be rock and/or hard clay. Engineers then used roped access down the densely overgrown cliff face to select and mark out the line. Drilling commenced from a small launch pit on the cliff top, with a mud motor and a hole opener for back-reaming. The bore was opened in stages to accept 180mm pipe.

John Salisbury, Galliford Try's Project Manager was impressed: "This scheme needed extremely careful planning and execution with no overrun. Perco's solution ensured that the guest house's gardens and orchard could be left completely undisturbed. The minimal amount of excavation necessary was restricted to an adjacent field, the surface of which was quickly and easily restored afterwards."

The project was part of Welsh Water's scheme to modernise sewage treatment facilities for the three villages of Llanbedr, Harlech and Llandanwg.

# DEMONSTRATIONS IN DEMAND!

**With any new trenchless technique there is keen interest in seeing the process in action before customers give their own seal of approval. EcoCIPP™ is no exception, with lining demonstrations in demand across the country. Here are two of the most recent trials...**

## On Show

A demo was held at Woodhouse Mill STW, Sheffield, for representatives of Yorkshire Water and Earth Tech Technologies. As the demo was performed above ground, the audience was able to see the entire procedure clearly. A 10m length of 225mm clay pipe was lined using the EcoCIPP UV lining technique and the successful showing has already led to a real project.

## On Test

Thames Water set a stiff test for lining systems, to assess the potential ingress of groundwater along the inner wall of the host pipe, into the sewer network. In two days of preparation and testing, a fixed head of water was applied to the interface between the pipe and the cured liner, to measure the effect of EcoCIPP's close-fit on reducing, or stopping water infiltration.

*EcoCIPP demo day - lining trial in preparation*

*Phil Luxton checks on EcoCIPP's progress*

# AIRLINER

**Our UV-cured relining system, EcoCIPP™, proved the best solution to a sewer-upgrading problem, on a busy Heathrow perimeter road. It also more than halved the projected cost of refurbishment and greatly reduced the safety risk.**

The decision to strengthen a 50m length of 300mm concrete sewer main set a tough test for standard trenchless methods, due to its location and severe restrictions on traffic management. Perco were initially called in by the contractor, Mc Aleer and Rushe, to look at pipebursting the main, which runs close to the site of BAA Lynton's new Jurys Inn development at Hatton Cross.

Temporary traffic lights were allowed from 7pm to 5am only, to avoid disruption to flight crew shuttle buses and T5 construction traffic. It was clear that pipebursting would be relatively expensive and completion could not be guaranteed in the time. A 5m working depth also presented safety risks.

We proposed relining the existing pipe, at around 40% of the cost of bursting and renewing in ductile iron. In conjunction with engineers TPS Consulting, the project was therefore re-designed for EcoCIPP relining in high strength GRP. After checking for and removing obstructions and logging any lateral connections, our team successfully installed and CCTV surveyed the 50m liner within the allotted time.

# Hi-tech Wheels for EcoCIPP™

**The latest addition to the EcoCIPP™ relining fleet is a custom-built, mobile control centre, or 'truck', as we prefer to call it.**

Fitted out in Germany, the truck not only carries an EcoCIPP rig but also has onboard monitoring and testing equipment for the system. Other facilities make life easier on site for a Perco relining team, such as a small rest area and even a fridge.


*Perco's EcoCIPP truck on demo duty*

# Sewers Upsized as Housing Multiplies

**Pipebursting is in demand as a consequence of Government pressure to increase housing density in developed areas. In a prime example, Expandit has recently upsized a sewer main under a major road, with no excavation and a minimum of traffic management, in one lane only.**

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Using an Expandit head to burst 44m of existing 225mm clayware pipe, Perco then pushed 355mm OD Snapit PE pipe sections into the enlarged annulus. Despite very wet ground the burst and install operation was completed in under six hours.

The work was carried out as part of a new drainage strategy for the Shilton Park Development, in Carterton, Oxfordshire, a housing development consortium led by David Wilson Homes and Robert Hitchins Ltd.

Commenting for Buchanan Consulting Engineers, Bill Harrison added: "It was enlightening to work with a specialist contractor, such as Perco. We now have the confidence to repeat this upsizing method with them, under plans to increase the number of accommodation units from around 950 in the original plan, to about 1,400."

*Left: an Expandit burster - as used in Carterton*

# DRILLING HELPS FLOOD SCHEME

**Flood prevention measures in Sussex required the installation of a 450mm polyethylene pipe over a distance of 315m. The pipe, installed by the Directional Drilling Division now drains a roadside manhole to a tunnel, which leads to the main sewer system in Gardner Street, Lewes.**

Drilling had to cross a road, several back gardens and a sports field, in addition to a manhole and shaft, while contending with a high water table and variation in soil conditions.

The tunnel connecting to Gardner Street was used to construct the pipe, in sections, ready for pulling. Access was via a 5.2m dia, 12m deep, jacked shaft (S3). Pipe was lowered into the shaft in 3m lengths, butt-fused and jacked into the drainage tunnel.

With the full 315m pipe string jacked in, the tunnel was then sealed by a steel plate until the drilling operation was completed.

Round-the-clock dewatering was provided by installing five pumped wells around S3.

A Perco DD6 drilling rig made a pilot bore on a constant fall, passing through a manhole at 6m depth and reaching S3 at 9m. The drill head was left behind the shaft wall until a core-drilled hole was made, allowing pre-reaming to commence.

Three pre-reams were completed, lowering the reamers into position down the shaft, as the operation progressed. The bore was upsized gradually to 650mm dia and the tunnel then re-opened to allow the rig to pull the pipe into place.

*Life goes on in Lewes during Perco's major DD work*

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