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DRY DRILLING IN THE CZECH REPUBLIC

Powermole International was contracted by Talpa RPF of Ostrava, Czech Republic on behalf of the Water and Sewerage Authority of Zlin to directionally drill under the River Morava at Napajedla in February 1999. The Powermole/SE Dry-Rock Directional Drilling system was chosen due to the failure of a conventional bentonite-based system, which although able to drill through the fine sand and gravel, slightly cemented at depth, was incapable of drilling through the hard rock formations, 3 m from the river bank.

The project aim was to install a 160 m length, 315 mm diameter HDPE pipe below the River Morava as part of a drinking water supply renewal programme. The Powermole/SE PM903 system, with 26 t pullback and 12,000 Nm torque, completed the 160 m pilot bore within one day, easily penetrating and steering through the hard ground conditions, where the conventional system had failed. Over the next few days the back reaming operation was carried out over three stages to enlarge the 130 mm diameter pilot bore to the required 350 mm diameter, allowing the HDPE pipe to be pulled into position in one working day.

However, during floods in March a section of the pipeline appeared to have been washed out by the torrent of water passing through a deep gully on the right hand bank of the river. This raised a question between the contractor and client as to whether the minimum depth of earth cover, of 1 m, had been achieved, taking into consideration the nature of the changing riverbed. After some two weeks of stalemate, it was finally agreed to repeat the crossing.

SECOND PASS

Returning to Napajedla in April to perform the second crossing, the client stipulated 3 m of earth cover in order to avoid the problems experienced in the winter crossing. In achieving greater levels of depth, harder rock formations were encountered, which posed no problem for the Powermole/SE dry-rock system with the pilot bore being completed in two days. Back reaming was carried out in 4 stages over a period of 3 days and the HDPE successfully installed clear of the river, enabling a permanent control shaft to be constructed.

Following on from the successful completion of the Napajedla project and as part of Powermole International's market entry into Eastern Europe, Powermole will be



The PM903 rig drilling under the River Morana at Napajedla, Czech Republic.

exhibiting at the International No-Dig event in Budapest in October, alongside Euro Iseki Ltd, the U.K. based member of the worldwide Iseki Group.

COMPANY

Euro Iseki purchased the business of Powermole International in line with Iseki's objective to break into the small bore market and in turn enable Euro Iseki to offer its customers a full range of No Dig installation technologies.

Currently Powermole International is undertaking a second project on behalf of Underground Molding Services for Turriff Contractors (period contractors for British Gas Transco) to install 70 m of 250 mm HDPE as part of a new gas main installation in Aberdeenshire, Scotland, following their success last December on a similar project. David Morrisson, Transco's engineering operations manager said of Powermole's work in Inverness last year: "The new machine not only had environmental benefits, but was also cost effective with the project proving significantly cheaper than other options".

A conventional wet drilling system attempted to perform the second project, however only succeeded in drilling 7 m of the 70 m distance, where the Powermole/SE PM903 dry-rock system completed the 130 mm diameter pilot bore in less than one working day.

DRY BORING SYSTEM

Powermole/SE's Dry-Rock Directional Drilling system utilises compressed air with a small quantity of biodegradable additive as lubricant to perform the drilling operation. The lubricant also produces a filter cake around the bore, which together with the compressed air act to prevent collapse of the bore. Spoil from the drilling operation is removed via the air-flow through the borehole. This unique dry-rock system employs a patented pneumatic/percussive head unit, which is automatically activated once the drill head comes into contact with hard ground conditions. Having simultaneous drilling and percussion ensures effective and consistent penetration no matter the ground conditions.

Being a dry system it clearly means that no mud motors, mixing or recycling plant are necessary, so eliminating unnecessary additional costs. In particular for labour, landfill and the transportation of numerous items of equipment and especially the thousands of gallons of water, all of which is associated with wet drilling. In addition, this dry system reduces environmental impact on the surrounding area, by minimising ground surface disturbance, by reducing visual intrusion and noise pollution thanks to its compact size and most importantly by utilising compressed air, which has no effect on the

environment. Other features of the system include its ability to manoeuvre sideways by traversing the tracks in a crablike manner, enabling it to step up onto kerbs, as well as having an independent powerpack so as to position the system in smaller than usual working areas, ideal for urban or congested work sites.

Location of the drill head is carried out by a walkover detection system, which determines its depth and inclination. Moreover, the pneumatic system does not affect the sonde in any way due to the unique sonde-housing configuration.

Powermole International also manufactures, supplies, contracts and hires other trenchless technology products, namely Powermoles (impact moles), pipe replacement by pipe bursting and pipe ramming equipment. The Powermole is a pneumatic tool comprising of only 7 components and contains no seals or washers and it has a simple $\frac{1}{4}$ turn of the air hose (without disconnection) reverse mechanism. A patented pyramid head is used for the pipe bursting system, which can burst open most types of pipe even against the joints. Pipe ramming employs special tapered ramming rings to ram steel sleeves into the ground for duct/service installations.

Giovanni getting ready to insert another rod into the pm903.



The product range also includes ground mapping radar systems, which employ a multi-array architecture for a more sophisticated survey. The IDS radar provides an automatic depth evaluation to determine the direction for trenchless methods, as well as providing soil segmentations, layering profiles and soil classifications. Information regarding utilities and other subsurface obstacles is transferred to a user-friendly CAD environment.

The advanced technology of the Powermole/SE Dry-Rock Directional Drilling systems offers the way forward for contractors and utility companies alike to compete in quite literally the toughest of markets.

edited by Ian Clarke
for Powermole International