

TERRA's New HQ in Reiden

TERRA AG is the largest Swiss manufacturer of trenchless pipe and cable laying equipment. The machines and tools of TERRA AG are used worldwide to lay pipes and cables underground for telecommunications, electrical power, sewer and water, without needing to trench through road surfaces with an excavator.

Trenchless pipe and cable laying

TERRA AG was founded 35 years ago. At that time the concept of trenchless technologies for underground pipe and cable laying did not yet exist. The first revolutionary idea was to cross a road with an underground piercing tool or "mole". The piercing tool is introduced into the ground from a launch pit and is driven through the ground, under the road, using compressor until it reaches the receiving pit on the other side of the roadway.



Underground piercing hammers became common tools for public works. The process of development produced the highest quality equipment available on the worldwide market.

Approximately 20 years ago the next revolution in trenchless technology



occurred with the introduction of Horizontal Directional Drilling (HDD). These HDD machines allow guided bores for several hundred meters. Today HDD machines drill underneath roads, railways, rivers and harbours.

During the past several years TERRA has also developed new pipe replacement methods. The unique cable buster TERRA-EXTRACTOR pulls with up to 40 tons (the weight of a fully loaded large truck). A cable is pushed through an old pipe. At the front end a cutting knife is attached to the cable. The TERRA cable buster bursts the old pipe and simultaneously pulls in a new HDPE pipe with a life time of 80-100 years.

New Company Building in Reiden

For historical reasons TERRA previously had 2 locations, the production plant in Zofingen and the assembly plant in Brittnau. Now both plants are united within the new company's building in Reiden with excellent logistics and facilities, along with 35 employees.

The owner of the TERRA AG is Dietmar Jenne. He studied mechanical engineering and management at the Technical University in Karlsruhe Germany. Research and Development are his life long passion and hobby.

The most important R&D ideas are protected by several world wide patents. In



spite of the company size TERRA fulfils the same tasks as a large concern: own R&D department, international patents, documentation according to European



Safety Norms, world wide sales, own production of know-how equipment, out sourcing of simple parts, controlling of approximately 200 subcontractors and suppliers, in-house assembly and quality control. Additionally TERRA co-operates closely with the Polytechnican and University of Windisch Switzerland. This co-operation is supervised by Dietmar Jenne personally.



Rod burster replaces 300 mm (12") pipe

The old main \varnothing 300 mm (12") steel water pipe in the Hungarian city Győr needed to be replaced with a new \varnothing 315 mm (12.4") HDPE pipe. The water line lay underneath the main road that experiences extremely high traffic densities every morning and evening. This necessitated a trenchless pipe replacement solution.

This interesting project was undertaken by the company Inter PA-KO. The company owner Mr. György Kovacs decided to use their rod burster TERRA-HYDROCRACK HC 600 S+ to undertake the replacement pipe work.

Inter PA-KO is one of the largest Hungarian pipe laying contractors with 100 workers. The company was founded in 1990 and today they operate in all of West Hungary.



The first few metres were easily replaced using a pulling force of 40 tons. However the pulling force increased rapidly to 60 tons and then the cutter stood still. It became necessary dig a small pit which uncovered a 50 year old repair involving a 1 m (3 ft) long steel pipe section \varnothing 400 mm (16") that had been slid and welded over the 300 mm (12") steel pipe, additionally two large flanges were welded at both ends of the repair.

This "sandwich" was dug out and the project was completed without any further surprises within a few days. The Hungarian TERRA dealer Unicum provided technical support to their customer Inter PA-KO during this pipe replacement project.



New MINI-JET MJLV 1600 in operation in Slovakia

A road crossing to the exhibition area in Nitra was needed to install an OD 110 mm (4") HDPE pipe to accommodate an electric power line. The installation was needed to be done by trenchless methods to avoid unnecessary disturbance to traffic.

The contractor' ZPP decided to undertake this project using their TERRA MINI-JET MJLV 1600. This is a MINI-JET in an extended version. This new HDD machine uses 1.5 m (5 ft) long drill rods \varnothing 45 mm (1.77") allowing a minimum bending

radius of 25 m (80 ft). Its torque of 1'600 Nm (1'200 ft.lbs) makes it possible in suitable ground conditions to produce bore channels up to 300 mm (12") and lengths of up to 120 m (400 ft).

ZPP is a specialist HDD drilling and steel pipe ramming contractor. They undertake special projects for trenchless pipe and cable laying throughout Slovakia, employing 10 workers.

For several years they have successfully installed steel pipes by pipe ramming using their TERRAHAMMER TR 220. Recently they have added the pit mounted HDD machine TERRA MINI-JET MJLV 1600 to their trenchless arsenal.



The 30 m long pilot bore through clay and gravel took less than one hour. The location of the drill head was done using the locating system RD 385. This allowed the drilling head to arrive precisely on target in the arrival pit.



The drill head was then removed and the backreamer \varnothing 160 mm (6") with swivel and the new HDPE pipe OD 110 mm (4") were attached to the drill rods. The backreaming and pipe pull-in took approximately 30 minutes.

ZPP received technical support from the Slovakian TERRA dealer KOLEX.

Innovation Award BAUMA 2010



TERRA is a medium sized company with a large degree of know-how and the highest international reputation. TERRA's latest development; the new vertical TERRA-DRILL for geothermal power has been nominated for BAUMA 2010's Innovation Award. BAUMA is the largest construction exhibition world wide. The TERRA-DRILL allows geothermal bores to be



made possible in narrow gardens within existing buildings.

Besides TERRA, large multi-national companies such as Liebherr and Bosch were nominated, as well as the Technical University of Dresden.

New Manhole HDD Drill with Rod Lift

Imagine being able to use existing sewer manholes to lay networks for electricity, gas and water without the need to dig up roadways or front gardens of private properties.

Swiss producer of trenchless pipe and cable laying equipment TERRA AG has developed such a manhole HDD drill that is able to undertake directional bores from manhole to manhole and from manhole to all near-by homes. At 0.8 m (2.5 ft) depth you can lay telephone cables, at 1.20 m (4") depth fresh water lines, and at 1.60 m (5 ft) depth gas or power lines.

This innovative pipe laying method was developed over a 2 year period in close cooperation with the French water supplier SADE.

The TERRA MINI-JET MJS 1600 is a manhole HDD drill for directional bores in lengths up to 50 m (165 ft) with a minimum turning radius of 15 m (50 ft).



The directional bore can be reamed in several steps up to 300 mm (12") even in hard ground. The TERRA MINI-JET MJS 1600 is equipped with a torque of 1600 Nm (1200 ft.lbs) and thrust and pull back forces of 60 kN (6 tons, 13'200 lbs).

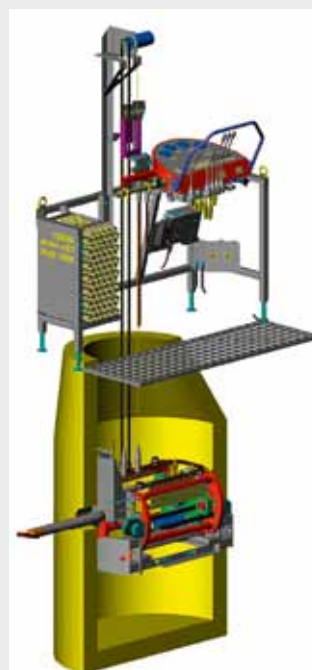
The MJS 1600 can drill from manholes with an internal diameter of 1.0 m (3.3 ft) and can fit through manhole entrances of just 0.62 m (25"). Where the entrance is smaller than this, the manhole cover frame can be removed. First the drill's bed frame is lowered into place in the manhole and tightened hydraulically in posi-

tion, thereafter the manhole drill is lifted vertically through the manhole cover and bolted onto the bed frame.

The entire operation of the TERRA MINI-JET MJS 1600 is controlled from the surface where the operator along with the control station, rod magazine and rod lift are positioned. There is no requirement to enter the manhole during drilling and back reaming work. The operator inserts a new drill rod into the rod lift.

The rod lift transfers it down into the manhole and positions it in the drilling machine. The new drill rod is screwed into the last drill rod. Inductive sensors make this operation possible even where the operator does not have a view into

the manhole. The rod lift may also be positioned at an angle over the drilling machine where the manhole entrance is not located directly on top of the drilling machine. Drilling and back reaming takes place with bentonite drilling fluid pressure of 0-55 bar (0- 800 psi) and drilling fluid volumes of 0-38 ltr/min (0-9 gpm). This makes the TERRA MINIJET MJS 1600 a small but extremely effective horizontal directional drilling (HDD) machine.



Traceable head now available for 55 and 68 mm TERRA-HAMMERS

The position and depth of traceable underground piercing tools (moles) can be determined along the entire length of the bore. The operator can be sure that the piercing tool is boring in the position that it should be in. This avoids unnecessary damage to buried cables and other services.

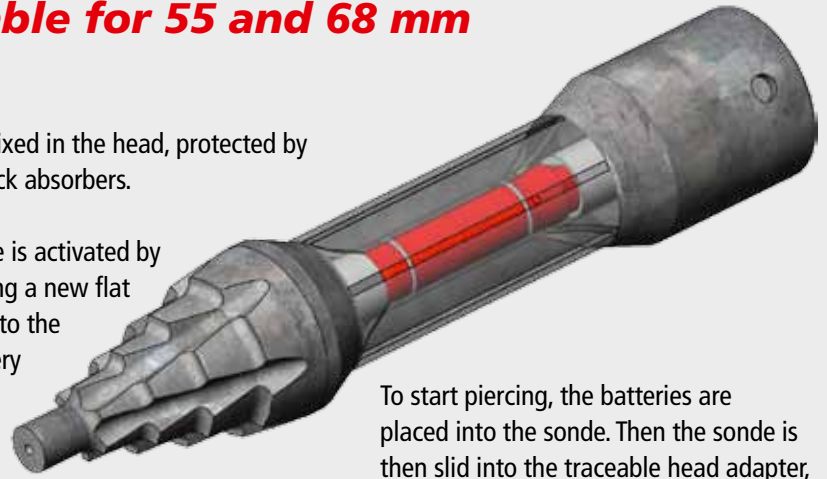
Needless to say, that the sonde must be positioned in the head of the piercing tool. If the sonde is fixed to the rear whip hose, it locates one meter too late.

In France new norms specify that where boring occurs near gas lines, a traceable piercing tool containing a sonde in their head must be used. For many years TERRA-HAMMER's with \varnothing 80-190 mm (3.15"-7.5") were offered as a traceable piercing tool. The sonde

remains fixed in the head, protected by large shock absorbers.

The sonde is activated by introducing a new flat battery into the side battery box; this allows the successful continuous operation of the sonde without removal from the head.

For the BAUMA 2010 in Munich, TERRA will introduce the newly developed traceable head adapters for small piercing tools of \varnothing 55 and 68 mm (2.16 and 2.68"). Due to the small diameters the technicians and engineers of TERRA had to develop a completely new design.

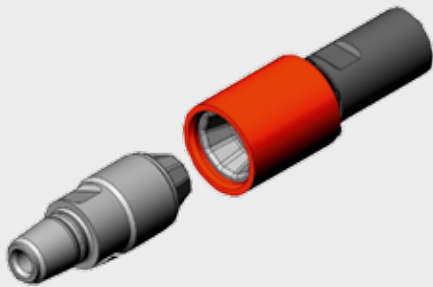


To start piercing, the batteries are placed into the sonde. Then the sonde is then slid into the traceable head adapter, inbetween two shock absorbers.

The head adapter is assembled into the TERRA-HAMMER TU 055 or TU 068. After the bore the sonde is removed again.

TERRA offers a powerful, lowpriced locating system that can be used not only for the location of the TERRA-HAMMER, but also for the location of metallic water and gas pipes and power and telecom cables.

Quick release couplings for drill heads and backreamers



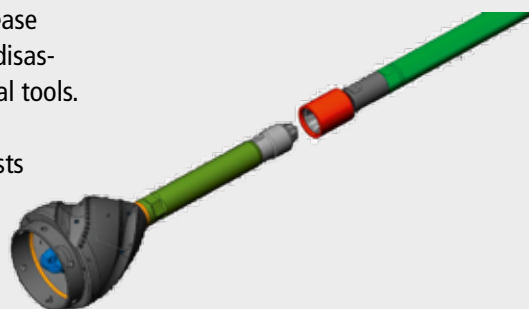
The newly developed quick release coupling for TERRA-JET HDD machines makes the disassembly of the drill heads and backreamers much easier.

Even after difficult bores in hard ground, where normal thread couplings become tighter and tighter, the quick release coupling can be assembled and disassembled manually without special tools.

The quick release coupling consists of a multi-sided taper which supports the torque, and an outer sleeve, which transfers the pulling forces. The outer sleeve

is screwed with left hand threads and therefore cannot open during drilling and backreaming. The outer sleeve is unscrewed manually after the pilot bore to attach backreamers.

Then the multi-sided taper connection opens easily. The quick release coupling may also be used for older TERRA-JET HDD machines. At present the quick release coupling is available for TERRA drill rods \varnothing 70 mm (2.75"). A smaller quick release coupling is planned for the drill rods \varnothing 55 mm (2.16").



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