Economic and fast installation of medium voltage cables:

Over the Hohenloher level with the cable plow

The regional centre at Neckar – Franken of the EmBW Regional AG is currently strengthening the 20 KV network in the Hohenloher Region. Medium voltage cables (3 x NA2XS2Y, 150 mm2 Al) are being installed over a total length of 6,5 km between the towns of Eschenhof and Hohenrot. With these cables the network is not only being strengthened, but also by providing a ring structure for a large company in the Hohenrot area to allow a standby service line. Furthermore there will also be some 1 KV-branch connections.

Installation measure – general civil engineering work

The contractors engaged were Föckersperger GmbH, Aurachtal for the cable plowing work and the building contracting company Benningern, Bad Mergentheim for all other civil engineering work. Including in this work were such tasks as inspecting all adjacent service lines ahead, the necessary excavation work, production of starting pits for the cable plow as well as road under-crossings. The last item was also carried out trenchless with a soil displacement hammer to produce ND 125 protection pipes.

The remaining civil engineering work, such as in the town of Weldingsfelden, where it was not possible to plow everywhere, as well as surface work to re-produce the given state of the surroundings, were also carried out by the contracting company.

Installation measure – cable plow work

The cable plow measure was carried out by the company Föckersperger in Aurachtal. The 3-headed team for the operation of the cable plow, winch vehicle and the group made up of an Unimog and cable trailer, installed the almost 5.000 m length of medium voltage cable in just 3 working days. Included in this time-span where transport to and from the jobsite, a minimal set-up expenditure as well as the installation of the cable and bore-path warning tape.

For the task a cable plow type, F 150 with it's own weight of 17 tons was applied. This weight is stabilised over 4 wide rubber wheels, which are fastened to 4 adjustable booms. This way it can be regulated hydraulically to accommodate any uneven terrains up to +/- 1,50 metres between two parallel running wheels, produce a ground free are up to 1,70 m and adjust the track width between 2 and 6 metres to drive around any obstacles. It does not surprise anyone that the spider-like vehicle can surmount gradients of 1 : 1. This plow, assisted by a cable winch is pulled by a Unimog (240 PS, 50 to cable winch, cut-in with 100 to pulling force), which is suitable for terrains. The pulling cable was pulled out at lengths of 75 to 100 m and worked off the cable plow at a moderate walking pace. For work in strongly rooted upper ground there is a cutting tool (steel disc with 80 cm diameter) installed inside the front area of the

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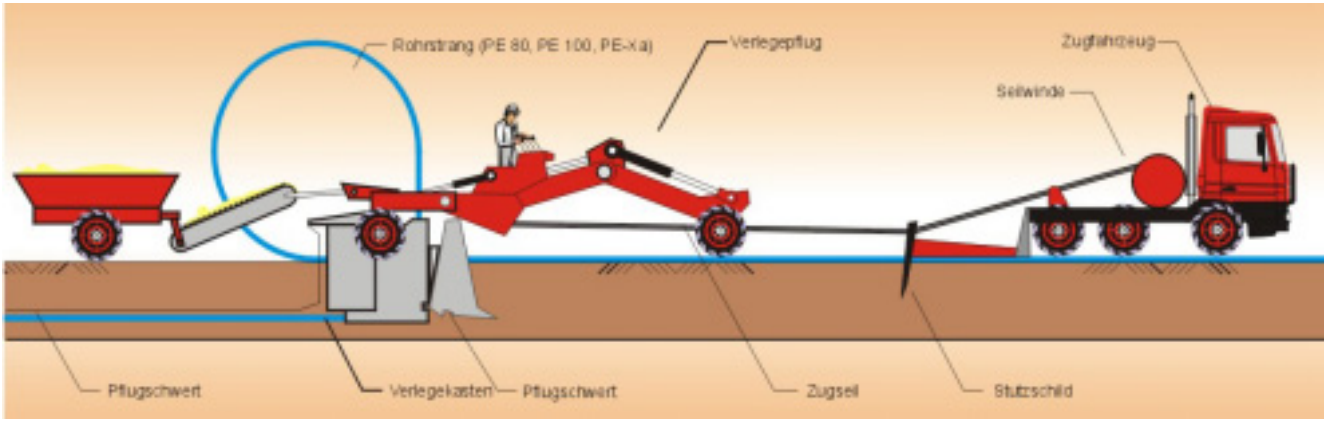
SPIDER Plow

cable plow, which can be lowered down to separate the roots in the upper ground and immensely lower any resistance during plowing.

For the plowing process the plow sword is placed inside the starting pit at the required height of the installation depth. Pulled by the cable the plow sword, extended with a wedge point, penetrates forward into the ground in the cable zone. In the hollow room produced the cable and the bore path warning tape are laid down. These are installed via the cable shaft, which is also hooked on and movable, so that both can be moved independently. Therefore, irrespective of topography and terrain inclinations, the sword and the cable shaft can always be guided horizontally to the ground surface and cables therefore controlled be installed at the required depth. If necessary the cables can be sanded into the ground mechanically.



Schematic illustration of the cable plow technique.

In the described case the ground was compact and slightly sandy, with rocky inclusions in some areas. These conditions were no serious problem for the massive and stable construction of the plow and the provided pulling force of up to 100 tons.

Plowing in of the cables

The concept of the winch-pulled cable plow proved to have further advantages in this certain case. The forward movement is produced stationary via the winch, therefore no traction forces arise on the plow. On self-driven cable plows the soft upper surface is usually strongly affected by deep driving or even digging tracks. However, during this task, only light indentations occurred even in the dried surfaces.

Even the circumstance, that over a large stretch of the distance the wheels were touching the asphalt and simultaneously touching the upper ground on the other side, was not a problem as no traction was required. Also, the multiple pulling force in opposition to the cable plows own weight of 17 tons can be applied even in difficult ground conditions, independent of the surface structure.

The plowing work carried out, clearly showed that everything could completed with the winch-pulled cable plow quickly and also with optical satisfaction. Even in soft surfaces there were hardly any visible tyre imprints in the ground. The re-instatement work carried out laterally was therefore not so costly.

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Pipe and cable plows from Föckersperger GmbH, Aurachtal have been manufactured and applied for over 30 years. Up to this day the company, acting as a service company, has installed more than 50.000 km cables and pipes with this technology and works annually with more than 400 building contractors in Germany, Austria, Czech Republic, Hungary and Poland.


Installed cable path.

Steering, telephone, glass-fibre and power cables, cable protection and drainage pipes as well as service lines for gas, water and sewage are ploughed into the ground.

The technical and economical advantages of this technique are:

- highest installation quality and low costs,
- Installation of up to 24 cables in one working process
- Installation of flexible pipelines up to 225 mm Ø
- Installation of rigid pipes up to 355 mm pipe diameter
- Installation of pipes made of PE, PE-HD, PE-Xa as well as steel and grey cast iron pipes (Rammer plow)
- Combinations pipe/cable – installation possible
- Daily capacities, depending on path up to 5000 m
- minimal construction times

The following are economical advantages

- very low traffic hindrances
- no soil blending
- minimal ground compactness
- best environment compatibility
- very low ground damage and
- 90% fuel savings

Föckersperger cable and pipe plows therefore play a major part in the trenchless installation of cables and pipes over long distances and provide a technically secure product and guarantee a speedy, economical and still environmental friendly execution.

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