

Herrenknecht AG has developed Pipe Express®, a new semi-trenchless method for laying pipelines. In comparison with the open-cut construction method it needs a considerably smaller route width, requires no groundwater lowering, and has less impact on the environment. Because of the particularly eco-friendly and cost-effective method of operation, the development of the new system is being funded by the German Federal Ministry of the Environment. Pipe Express® has received the Bauma 2013 Innovation Award from a panel of experts. Pipe Express replaces the conventional method of excavating a trench, lowering pipe with pipe laying cranes, and backfilling the soil. At a speed of up to 1.20 meters per minute the pipeline is simultaneously excavated and laid underground. Pipe Express® can fully exploit its advantages in projects where the water table is only a few centimeters below the surface, where boggy terrain predominates, or where conservation plays a special role.

Pipe Express® is a complete new mechanized method for the near-surface installation of pipelines of up to 1,000 meters in length and with diameters of 800 to 1,500 millimeters (32" to 60"). A tunnel boring machine is attached to a trenching machine that moves horizontally on wheels. The boring machine loosens the soil which is then directly conveyed aboveground by the attached trenching unit. At the same time, the continuous pipeline is push-fed from behind by a pipe feeder. Since earthwork is reduced to a minimum and no groundwater lowering along the route is necessary, Pipe Express® has very little impact on the environment. This method is unique: For the installation of pipelines with a diameter of up to 1,500 millimeters, the soil is directly removed and not pushed aside. Pipe Express® is ideal, for example, for projects in which the groundwater level is only a few centimeters below the terrain's surface, in mainly swampy terrain, or when nature protection is of special importance.

Minimum manpower and a high degree of work safety

The main components of the new installation system include a tunnel boring machine that works underground, an attached trenching unit with a buggy, and an operating vehicle on the terrain surface. The modular design of the entire system allows easy transport and relocation, as well as high flexibility in changing project conditions. The compact system is powered and remote controlled from the operating vehicle, and no trenches have to be dug. This means that a minimum of heavy earthmoving equipment and manpower are needed which increases work safety.

Cost savings thanks to minimum earthwork

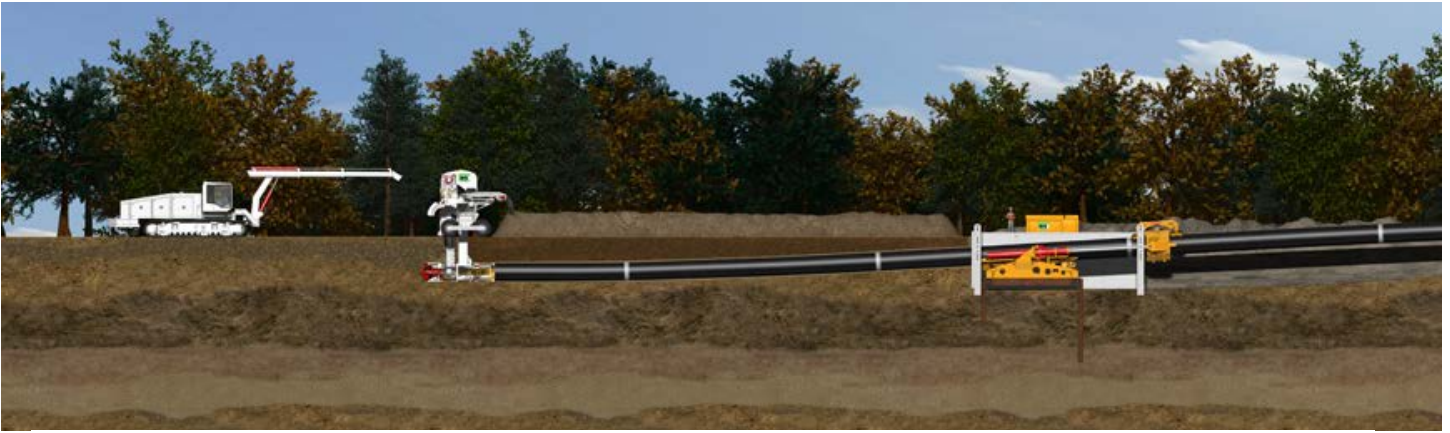
The new method has a positive influence on the realization and renaturalization costs in projects taking place in particularly challenging areas with unstable ground, water-bearing layers, and at great installation depths. Compared to the conventional open construction method, with Pipe Express® the route width can be reduced by up to 70 percent, thus reducing the necessary earthwork. When crossing agricultural land, major harvest losses with their long-term compensation payments can be prevented compared to open construction mode.

Environmentally-friendly installation of pipelines

By using Pipe Express®, the influence of the construction activities on the surrounding environment can be reduced to a minimum. Acceptance by the population, land users and land owners is improved due to the reduced implementation of large equipment and thanks to shorter construction periods. The natural soil structure is only disturbed to a minimum, making subsequent recultivation easier. No complex groundwater lowering is required along the route, and water-saturated soil layers are prevented from drying out. In addition, as the pipeline is installed fast and in one work step and fewer conventional construction machines are needed, emissions of exhaust gases and noise can be considerably decreased.

Test drillings and a first reference project completed successfully

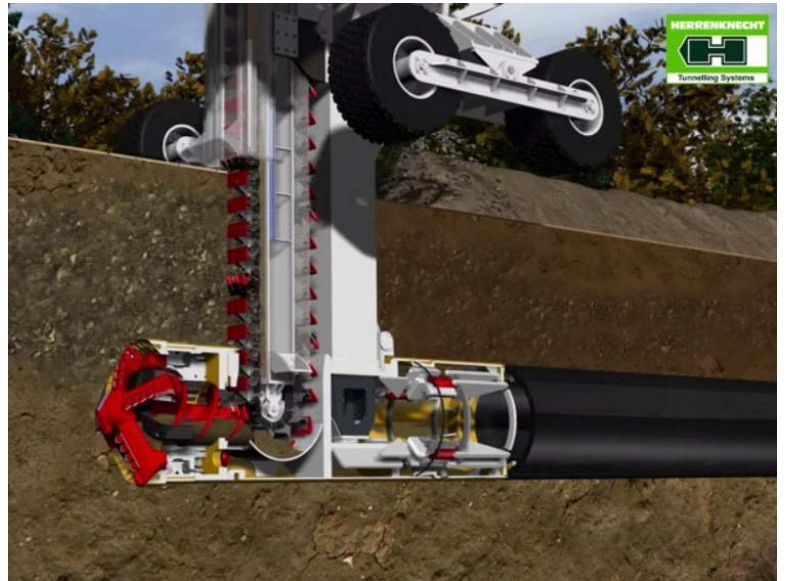
After Herrenknecht AG had initially carried out test drillings on the company site at the Schwanau headquarters over one year, the new machine technology could be applied in a first reference project in Sevenum, Netherlands at the end of 2012. "Pipe Express® has exceeded all expectations," noted project manager Andreas Diedrich with satisfaction and continued to explain: "The machine works with a tunneling speed of up to one meter per minute, which means that 500 meters of pipeline were installed in three days." The construction company Visser & Smit Hanab is currently building a new high pressure gas line between Odiliapeel and Melick for the Gasunie grid operator. On a section of this line, the Herrenknecht innovation was put to use. Visser & Smit Hanab's managing director Wilko Koop confirmed: "I am very enthusiastic, everything worked excellently."



Right to left: Pipe feeder pushes pipe as machine bores pipe tunnel, powered/controlled by operating vehicle



Ground level view of machine in action



Underground cross-section of machine in action



Conventional method: Pipe laying cranes place pipe in open cut excavation, which will then be backfilled