



HERRENKNECHT TUNNELLING

FULL RANGE TECHNOLOGY

HERRENKNECHT



Tunnelling Systems

PIONEERING UNDERGROUND TECHNOLOGIES

Efficient transport systems and supply and disposal infrastructures are a prerequisite for mobility and quality in life. Mechanized tunnelling technology allows for modern underground infrastructures of all kinds to be manufactured at top quality. For more than 45 years, tunnelling technology made by Herrenknecht has been paving the way for this through the underground. With technological innovations and further developments, we have contributed a great deal to the fact that there are TBM types available today for every geological formation and all diameters.

Mechanized tunnelling has clear advantages over conventional methods: it is more cost-efficient, safer, quicker and more eco-friendly. About 6,200 reference projects successfully and safely mastered with Herrenknecht technology reflect this. We deliver project-specific tunnel boring machines with diameters from 0.1 to 19 meters and for all ground conditions – always adapted precisely to depths, gradients, curves, lengths and the topographic conditions along the alignment. With the entire range of methods and tailor-made equipment and services, we offer customers everything they need to build efficient tunnel systems precisely and reliably.

We at Herrenknecht see ourselves as pioneers in underground construction and we will continue to develop ideas together with our clients and contractors in future to make tunnel construction even safer and more efficient. Always following the motto: “Think positive. Together we are building our future.”

Sincerely,



Dr.-Ing. E.h. Martin Herrenknecht
Chairman of the Board of Management



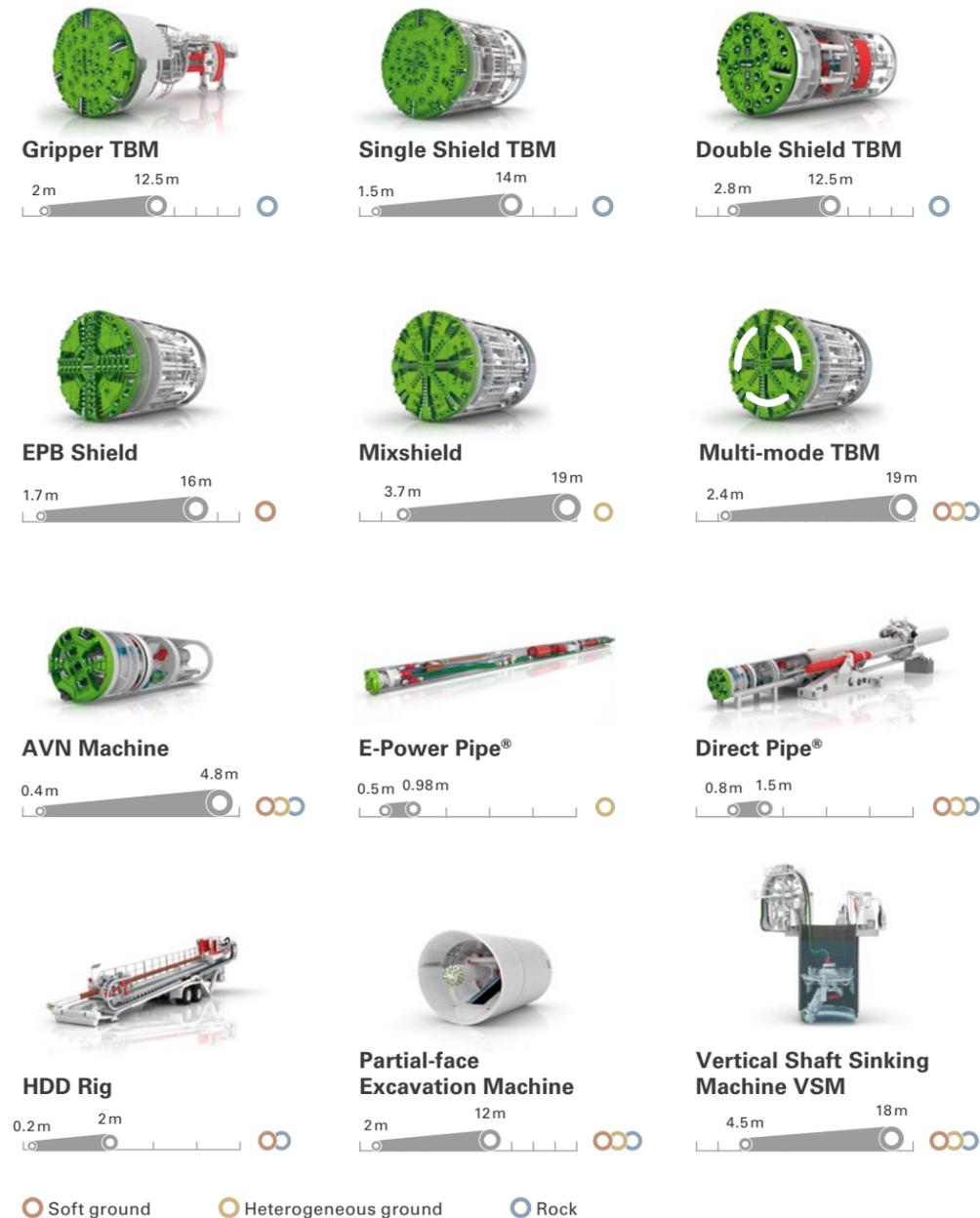
Headquarters in Schwanau:
Shortly after the company was founded in 1977 by Dr.-Ing. E. h. Martin Herrenknecht, Schwanau became the company's headquarters. To date, this is the main location accommodating design, component manufacturing, and assembly facilities.



HERRENKNECHT CORE PRODUCTS

Tunnelling technology for all geologies, all diameters and all applications.

Herrenknecht is the only provider of a complete range of mechanized tunnelling technology. All available machine types are designed for a specific field of application. When selecting the optimum machine type, all relevant project parameters like geological or hydrogeological conditions are considered. This means that the best solution for safe and fast tunnelling can always be found in close cooperation with all project partners involved – even for the most demanding challenges.



HARD ROCK

High-precision tunnelling under hardest conditions

Herrenknecht offers the entire product range in mechanized tunnelling technology for use in hard rock: open Gripper TBMs, Single Shield TBMs and Double Shield TBMs. Our machines provide high-performance tunnelling in all diameter ranges and high levels of safety. Integrated logistics processes and highly precise excavation allow the production of top quality tunnel structures also in challenging rock formations – often in record time.



Learn more about our hard rock TBMs, additional equipment and services as well as reference projects worldwide by scanning the QR Code.

GRIPPER TBM

EXCAVATION DIAMETERS



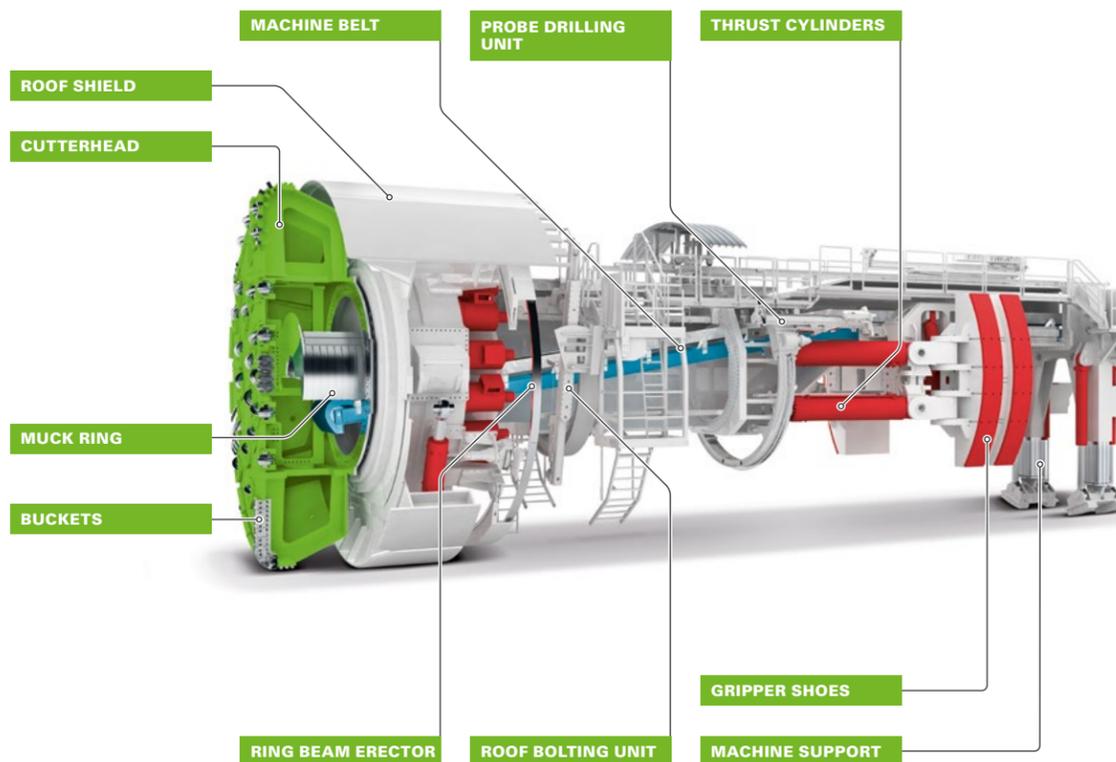
GEOLOGY



› Rock (hard, stable rock such as granite, gneiss or basalt)

ADVANTAGES

- › High and constant tunnelling performances and highly precise excavation in stable rock formations.
- › Measures to secure the rock increase safety for personnel and machine in fault zones.
- › Mobile partial shields allow for flexible reactions to convergences.



SINGLE SHIELD TBM

EXCAVATION DIAMETERS



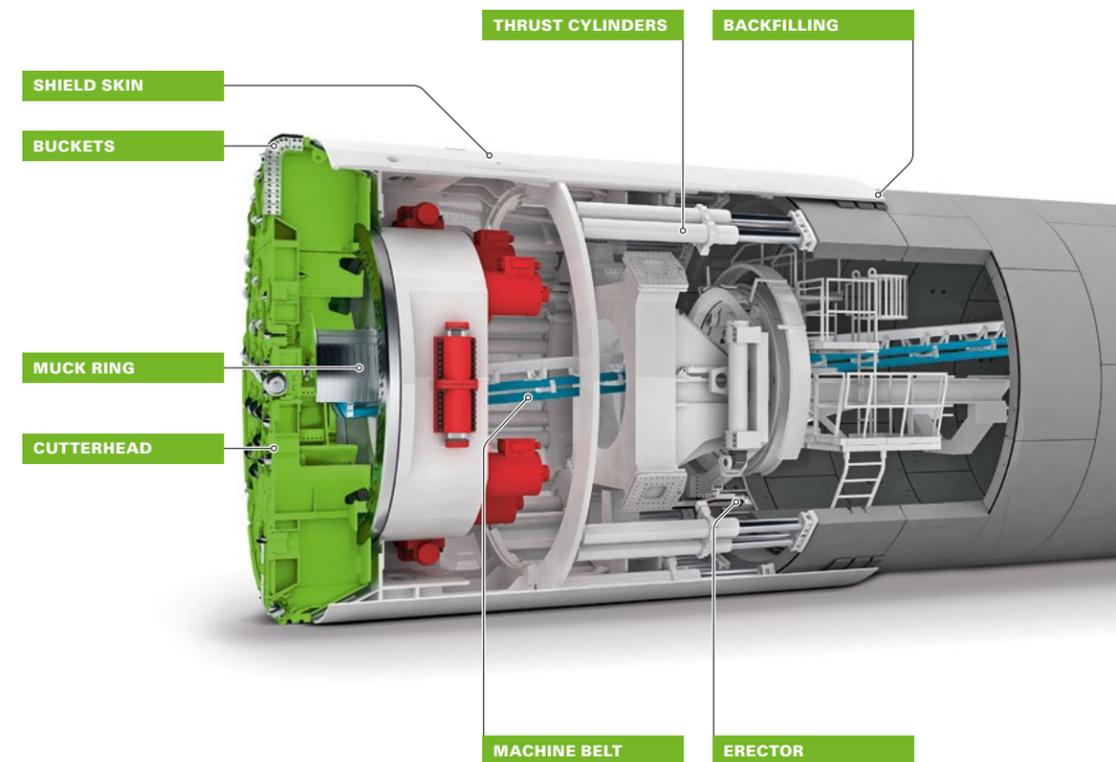
GEOLOGY



› Rock (soft, brittle rock to hard basalt)

ADVANTAGES

- › High advance rates in all kinds of rock.
- › Optimum tunnelling safety in brittle, non-stable rock formations.
- › Also usable in groundwater-bearing geologies with prior soil conditioning.



DOUBLE SHIELD TBM

EXCAVATION DIAMETERS



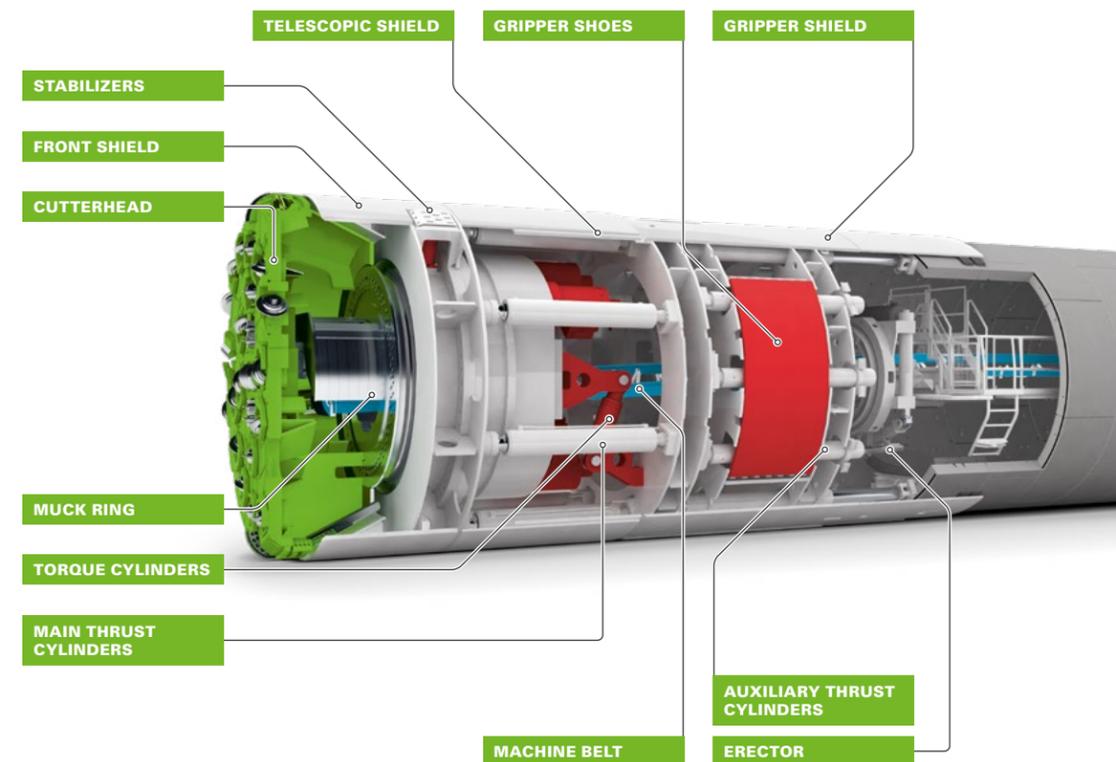
GEOLOGY



› Rock (all kinds of stable and unstable rock)

ADVANTAGES

- › High advance rates in stable rock due to continuous tunnelling operation.
- › Flexible use in all kinds of rock.
- › High level of work safety for the machine personnel in geological fault zones.



SOFT & MIXED SOIL

Maximum safety in diverse ground conditions

The main task when tunnelling through soft and heterogeneous ground, sometimes also with high water permeability, is to maintain stable support pressure at the tunnel face. EPB Shields and Slurry Machines from Herrenknecht allow for precise control of the support pressure and therefore safe and fast tunnelling in complex geologies. And with Multi-mode TBMs, Herrenknecht is able to deliver machines that can be flexibly adapted to drive through highly variable ground conditions along one tunnel alignment.



By scanning the QR code you can find out more about our soft and mixed ground machines, additional equipment and services as well as reference projects worldwide.

EPB SHIELD

EXCAVATION DIAMETERS



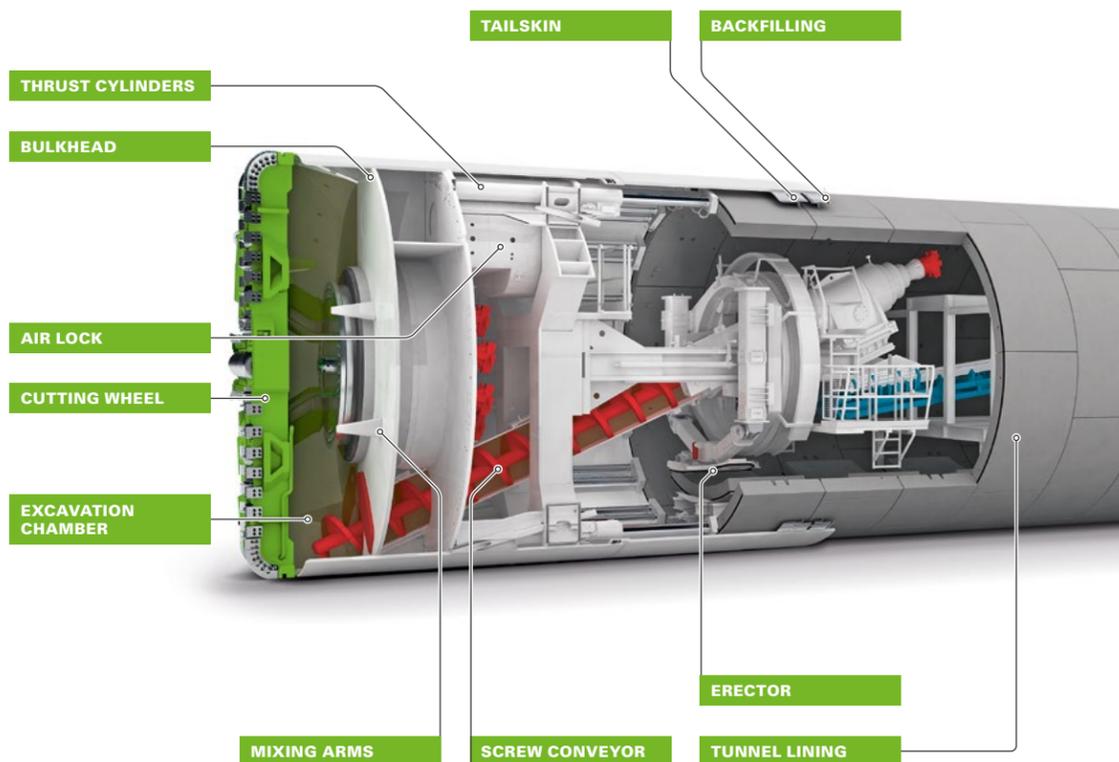
GEOLOGY



- › Soft ground (clay, silt, loam, low water permeability)

ADVANTAGES

- › Very high and consistent advance rates possible in cohesive soils with high clay or silt content.
- › Geological range of application can be enhanced by soil conditioning.
- › No additional support medium required.
- › A range of special solutions available for heterogeneous soil conditions.



MIXSHIELD

EXCAVATION DIAMETERS



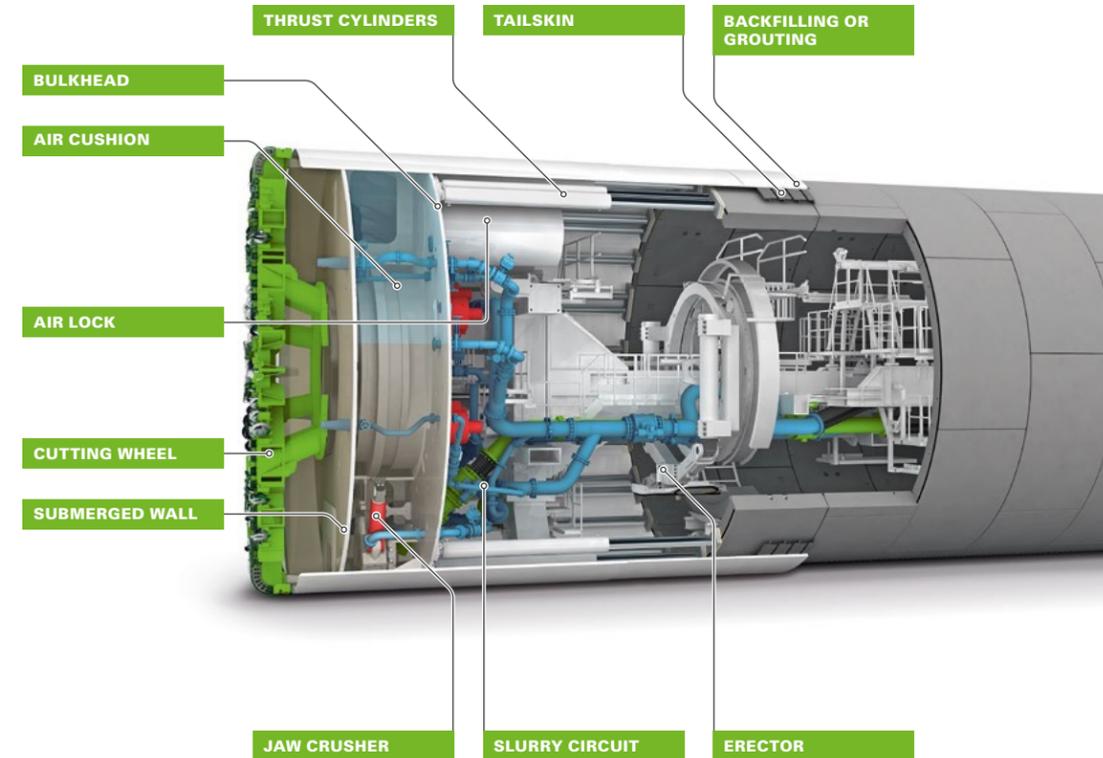
GEOLOGY



- › Heterogeneous ground (sand, gravel, high water permeability and water pressures)

ADVANTAGES

- › Maximum tunnelling safety due to precise support of the tunnel face with an automatically controlled air cushion.
- › Usable in high water pressures of more than 15 bar.
- › Even very large diameters of up to 19m possible.
- › Special solutions available for special project requirements.



MULTI-MODE TBM

EXCAVATION DIAMETERS



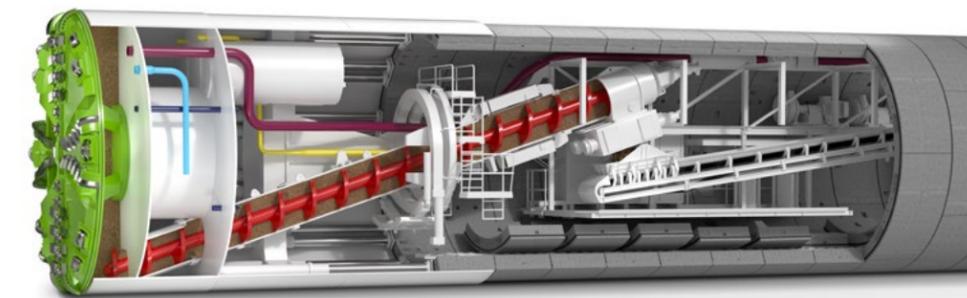
GEOLOGY



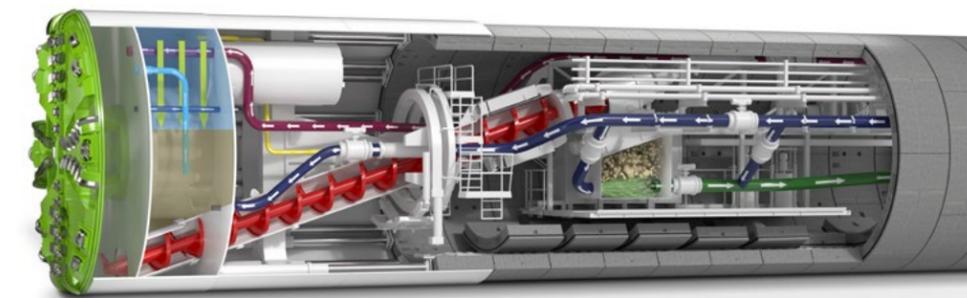
- › Soft ground
- › Heterogeneous ground
- › Rock

AVAILABLE COMBINATIONS

- › EPB – Open-face
- › Open-face – Slurry
- › EPB – Slurry
- › TBM Variable Density®



TBM Variable Density® in EPB operation mode



TBM Variable Density® in slurry operation mode

UTILITY TUNNELLING

The trenchless way for quick installations

High-performance supply and disposal systems are being built worldwide using mechanized tunnelling technology from Herrenknecht. Our utility tunnelling machines dig quickly and safely through any underground even under very tight space constraints: no matter whether for new water and wastewater systems, electricity or hydropower plants or for the installation of pipelines. Always with the great advantages that trenchless tunnelling offers: transport, economy and environment on the surface remain largely undisturbed.



Scan the QR Code to learn more about our utility tunnelling machines, additional equipment and services as well as reference projects worldwide.

AVN MACHINE

EXCAVATION DIAMETERS



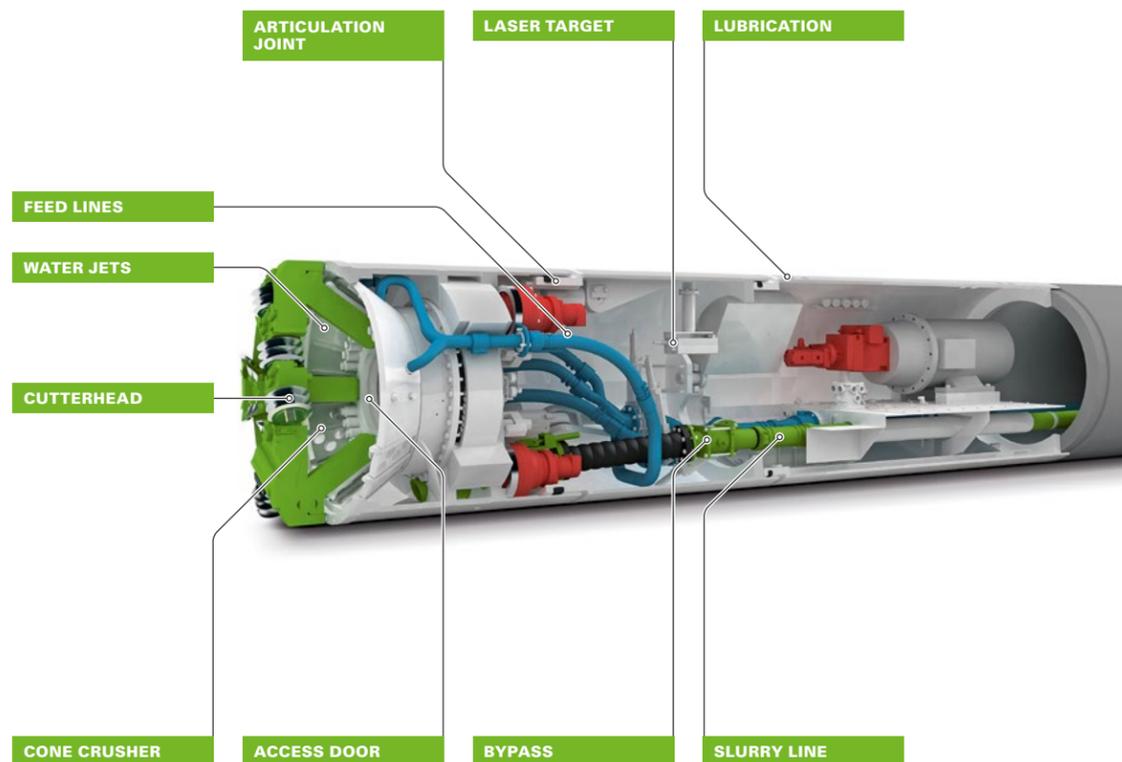
GEOLOGY



- › Soft ground
- › Heterogeneous ground
- › Rock

ADVANTAGES

- › Usable in almost all ground conditions and with high water pressures.
- › Highest tunnelling safety due to hydraulic tunnel face support.
- › Ideal technology for tunnelling in the non-man-entry diameter range (micro-tunnelling).
- › Precise control even with small radii in vertical and horizontal curves.



E-POWER PIPE®

EXCAVATION DIAMETERS



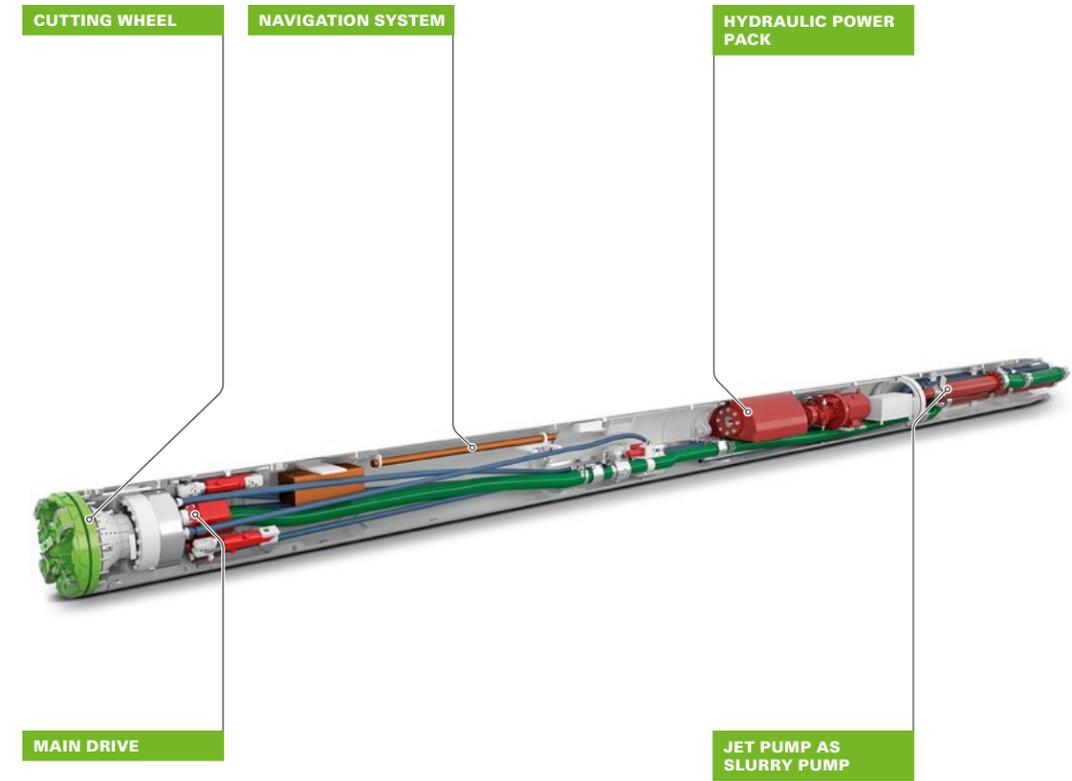
GEOLOGY



- › Heterogeneous ground

ADVANTAGES

- › Fast, reliable and precise product pipe installation at shallow depths.
- › Use of all product pipe materials possible, e.g. HDPE.
- › Insertable pipe diameter: 0.25-0.914m (10-36"), insertion of smaller diameters or bundles also possible.
- › Remote-controlled boring and product pipe insertion.
- › Controlled annulus backfilling for safe embedding.
- › Borehole support at all times.
- › Excavation under groundwater.



DIRECT PIPE®

EXCAVATION DIAMETERS



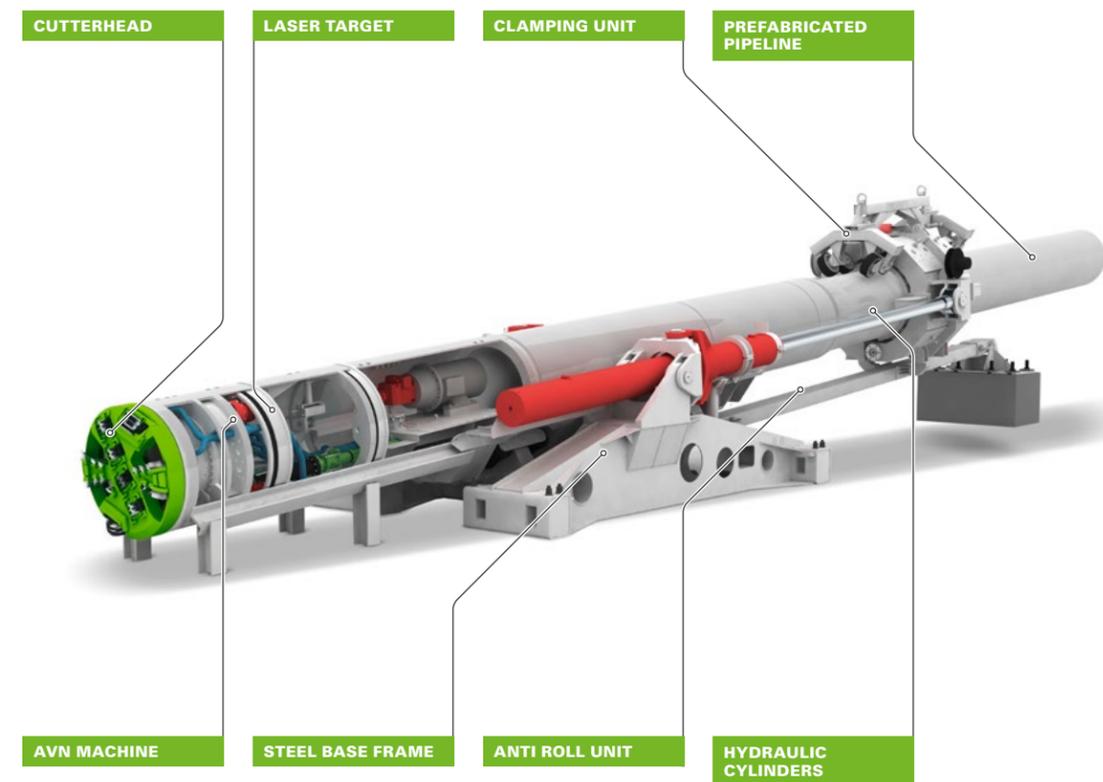
GEOLOGY



- › Soft ground
- › Heterogeneous ground
- › Rock

ADVANTAGES

- › The borehole is created and the prefabricated pipeline inserted in one single, continuous step.
- › Permanent support for the borehole.
- › Very high installation speeds.
- › No expensive shaft construction required.
- › Precise steering possible.



ALL DIRECTIONS

Special Herrenknecht machines for particular tunnelling missions

Over 45 years, Herrenknecht has distinguished itself in the tunnelling market by constantly developing project-oriented innovations. Whether horizontal, vertical, or inclined: we offer machines for the construction of underground infrastructures, no matter in which direction. Special developments such as the field-proven Vertical Shaft Sinking Machine (VSM) or Deep Drilling verify that Herrenknecht, together with its customers, always finds a solution to achieve the most safe and economical completion of every tunnel project.



You can find out more about our special mechanized tunnelling solutions by scanning the QR Code.

HDD RIG

EXCAVATION DIAMETERS



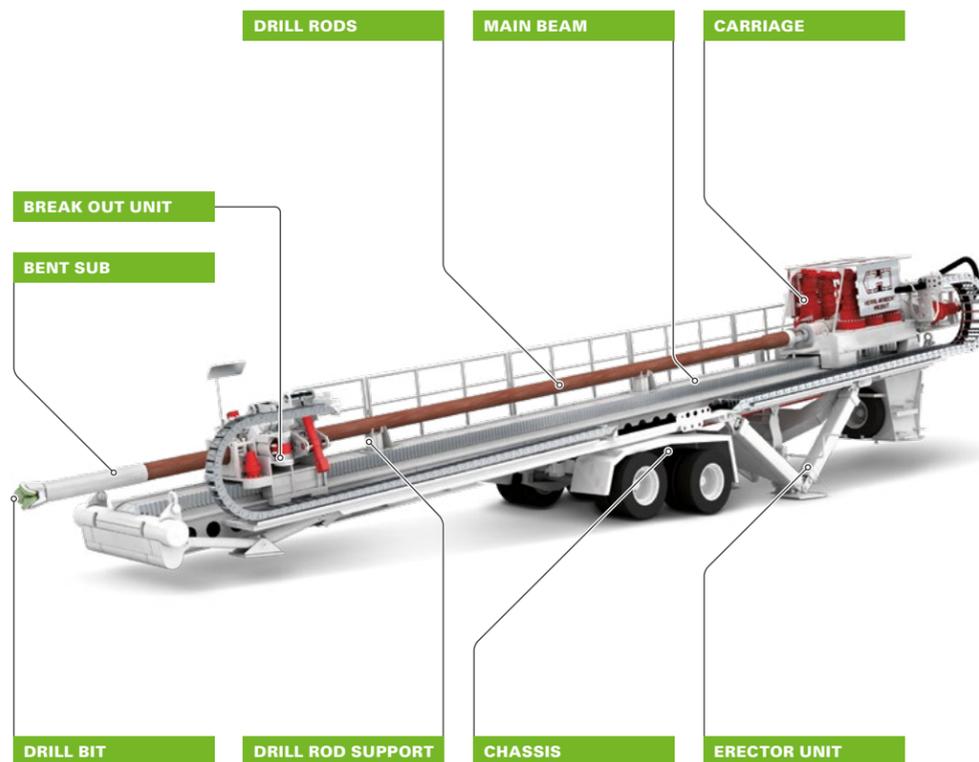
GEOLOGY



- › Soft ground
- › Rock (relatively stable grounds are a prerequisite)

ADVANTAGES

- › Economic and environmentally-friendly method for installing pipelines.
- › Broad geological range of application: stable loose soils and rock.
- › Four basic rig types for different ranges of implementation available.
- › Using the Pipe Thruster, the available thrust and pull force can be increased (up to 750t additionally).



PARTIAL-FACE EXCAVATION MACHINE

EXCAVATION DIAMETERS



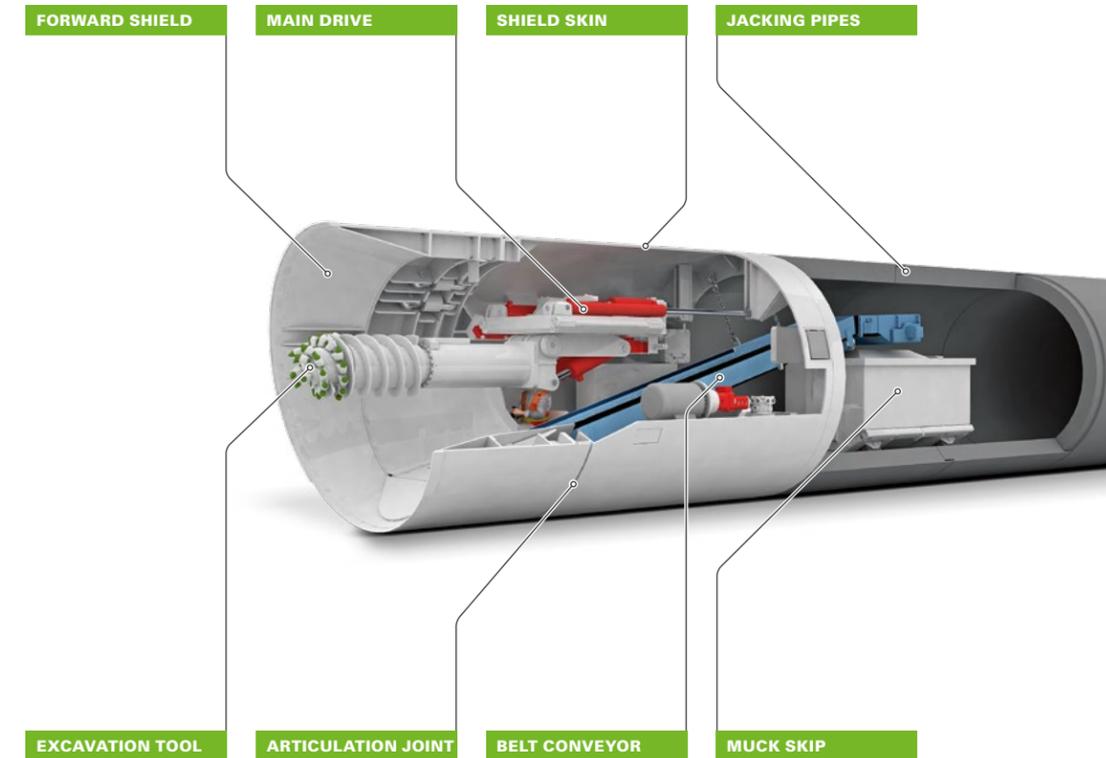
GEOLOGY



- › Soft ground
- › Heterogeneous ground
- › Rock (up to 80 MPa)

ADVANTAGES

- › Usable in almost all non-ground-water-bearing geologies.
- › Various excavation tools for various geologies available.
- › Easily and quickly convertible.
- › Exact control of the excavation process: the operator sits directly beside the open tunnel face.
- › Low operating costs.



VERTICAL SHAFT SINKING MACHINE VSM

EXCAVATION DIAMETERS



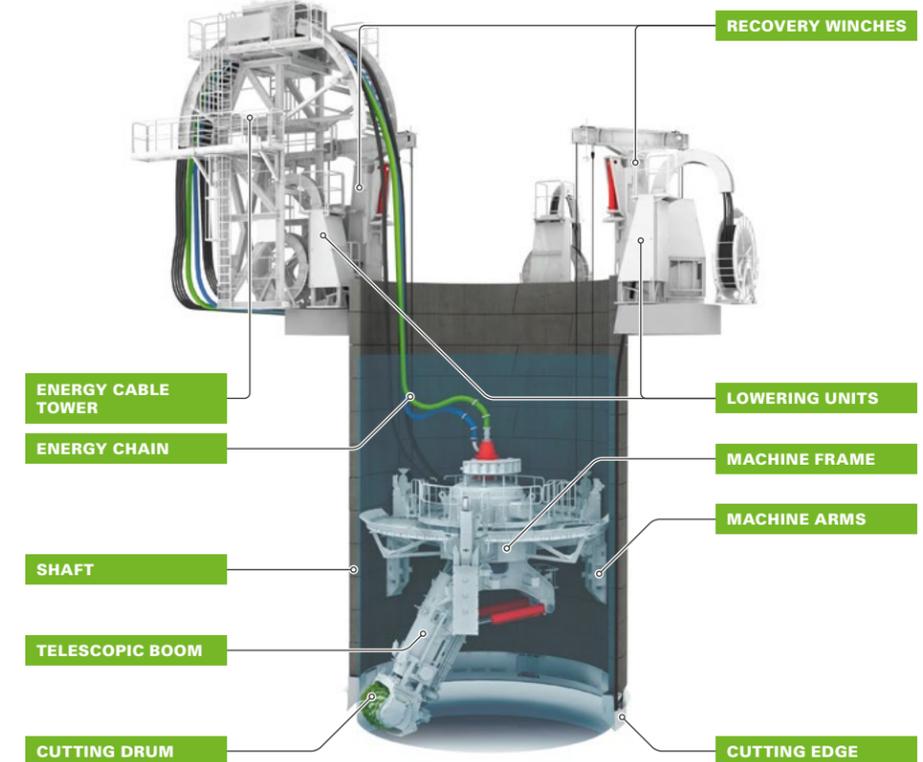
GEOLOGY

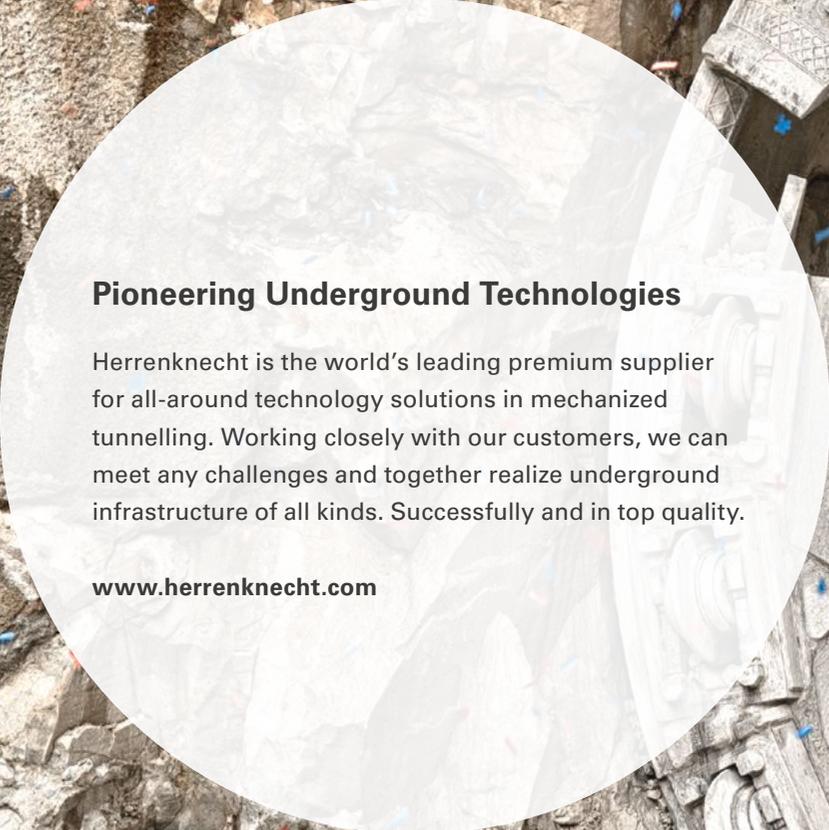


- › Soft ground
- › Heterogeneous ground
- › Rock

ADVANTAGES

- › Can be used in soft and stable soils up to 80 MPa and below ground water.
- › High advance rates of up to 5m per shift due to parallel work processes.
- › Flexible arrangement of the machine equipment enables use even under tight space constraints.





Pioneering Underground Technologies

Herrenknecht is the world's leading premium supplier for all-around technology solutions in mechanized tunnelling. Working closely with our customers, we can meet any challenges and together realize underground infrastructure of all kinds. Successfully and in top quality.

www.herrenknecht.com

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