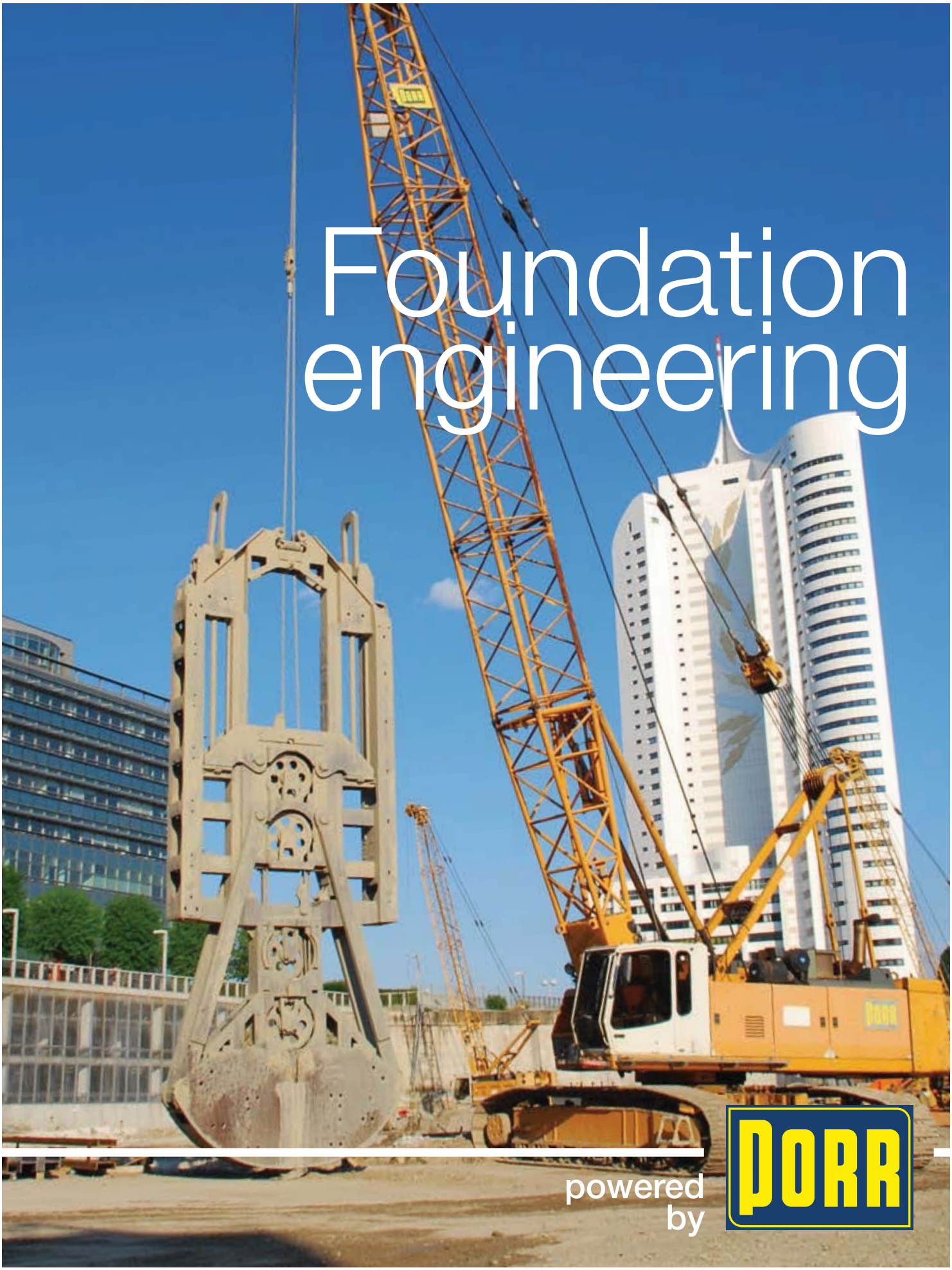

Foundation engineering
powered by
DORR

Milestones

2011

2011: DC TOWER 1
At a height of 220 m, the DC Tower 1 will be Austria's tallest building upon completion. PORR foundation engineering was responsible for the comprehensive pit and foundation works on this technically challenging, large-scale project and was once again able to display its expert skills.

2008

2008: SAVA BRIDGE
The new cable-stayed bridge over the Sava is one of the most modern bridges of its type anywhere in the world. The 200 m-high pylon, span of 375 m and 45 m-wide deck presented an enormous technical challenge which PORR overcame with aplomb. On this project PORR's foundation engineering specialists employed a customised solution for the pylon foundations.

2004

2004: RIVER WIEN COLLECTOR SEWERS
PORR Group installed reinforced concrete diaphragm walls up to maximum depths of 50 m for the Wiental-Kanal (River Wien Valley Sewer).

1997

1997: TIROLER ACHE BRIDGE
For the deep foundations of Tiroler Ache bridge piles reaching maximum depths of 70 m were placed. For the first time, PORR used bentonite slurry as a supporting medium.

1994

1994: DEEPEST DIAPHRAGM WALL IN EUROPE
The foundation engineering department of the PORR Group constructed the deepest diaphragm walls in Europe with the grab method. They are situated at the intersection Schüttdorf/Zell am See with maximum depths of 104 m.

1992

1992: FREUDENAU DANUBE POWER PLANT
The foundation engineering department of the PORR Group implemented all specialist foundation construction operations (diaphragm walls, sheet piles, anchors, vibrated VIB-walls). Up to 5 diaphragm wall units have been in permanent operation.

1974

1974: U1 STEPHANSPLATZ
The construction of the Vienna Underground started in 1969 and gave major impact to the construction sector. PORR AG participated in a leading position in some sections, i.e. from Stephansplatz to Nestroyplatz of line U1. The picture (taken in 1974) shows the open pit with back-anchored bored pile walls of line U1, Stephansplatz.

1934

1934: EXPRESS PILES IN PALESTINE
The pile foundation method for buildings developed by PORR turned out to be highly successful throughout the 1920's and 1930's. It was widely employed for international projects. The photo taken in the summer of 1934 shows foundation works in the concrete plant Nesher in Haifa, Palestine with roughly 400 express piles.

1927

1927: FOUNDATION PILES KARL MARX HOF
One example of the many pile foundation works which PORR has carried out on Viennese council buildings is the Karl Marx Hof in Vienna's 19th district, where around 8,000 piles were driven with 12 newly built, cutting-edge machines, known as „Grundkörpermaschinen“.

1904

1904: EXPRESS PILES
Parallel to the development of cast-in-place concrete piles in the USA, Ottokar Stern from PORR devised a method of his own: foundations on „floating piles“. In 1904 this method was first applied in Vienna. In 1911 the Imperial and Royal Patent Office issued the patent certificate.

1869

1869: FOUNDATION OF „ALLGEMEINE ÖSTERREICHISCHE BAUGESELLSCHAFT“
First listing on the stock exchange. In 1927 the company merges with A. Porr Betonbauunternehmung GmbH.

Foreword

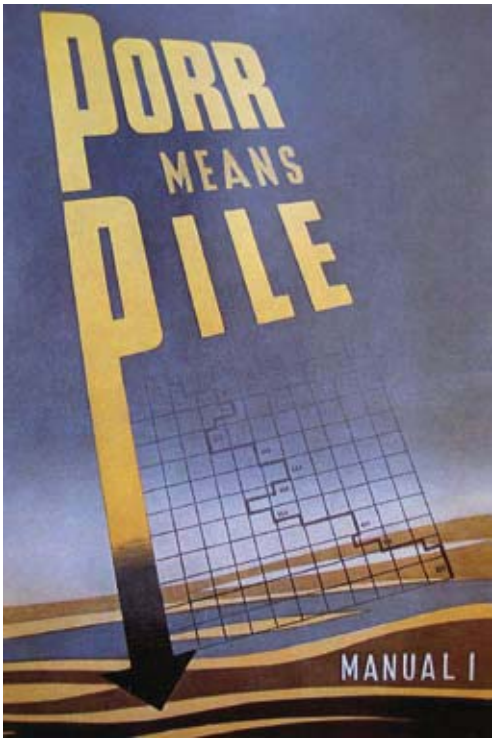
The foundation engineering department of the PORR Group is active in all services of special foundation engineering in Austria, Germany and in Central and Eastern Europe.

Numerous services are offered: „heavy machinery“ technologies such as vibrated VIB-walls reaching maximum depths of 30 m, sheet piling up to a depth of 26 m, diaphragm walls and bore piles as well as „light“ special foundation engineering operations such as micro piles, anchors, jet grouting, injections and pile driving.

The construction of the deepest diaphragm walls in Europe with a depth of 104 m (Zell am See) and the 70 m deep foundations of Tiroler Ache bridge (Chiemsee) with large-diameter bore piles are two examples that demonstrate PORR's state of art engineering performance.

In addition to the PORR headquarter in Vienna, there are local branches in Linz, Munich, Budapest and Bucharest.

This folder is addressed to all clients, experts and friends of PORR and provides an overview of procedures and solutions in special foundation engineering situations. Our experienced team is at your service not only for the realisation of projects but also for the design of optimized alternative solutions.



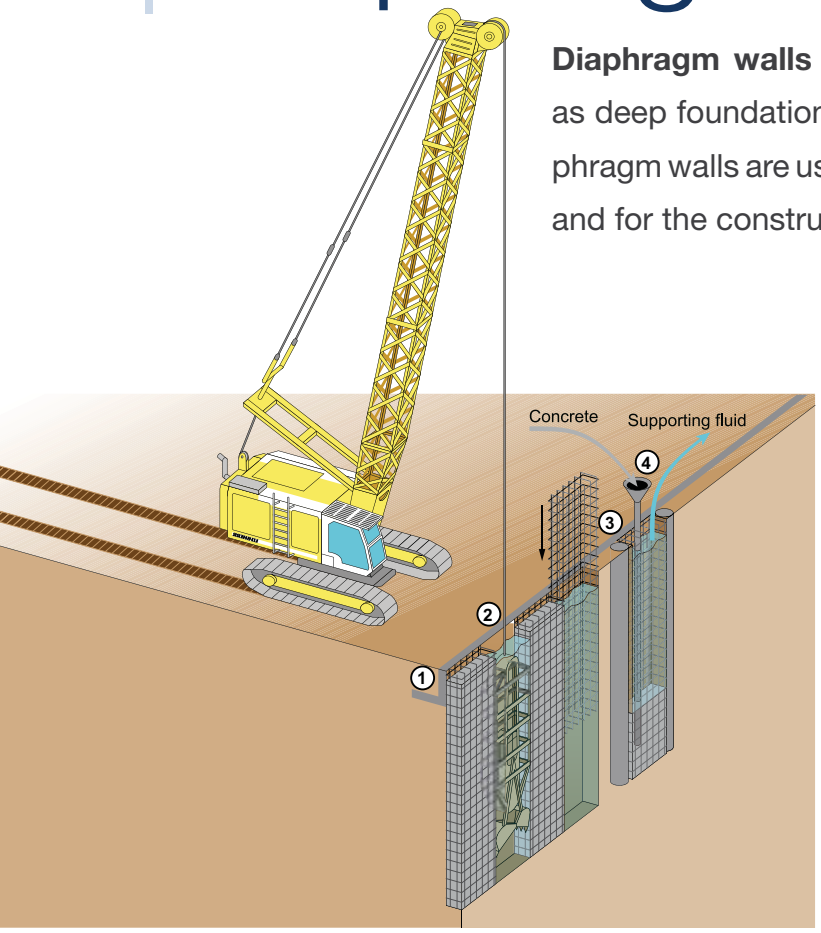
Brochure of the year 1953

Working programme

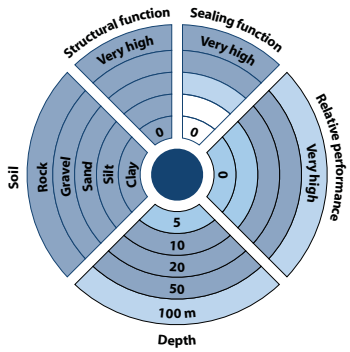
Inserting diaphragm wall reinforcement, U2-1 Schottenring, Vienna

1 | Diaphragm walls

Diaphragm walls are applied for deep excavations and as deep foundation elements with a statical function. Diaphragm walls are used for landfills, for flood control projects and for the construction of sealing walls (cut-off walls).



Technical Data	
Thickness of diaphragm wall	40, 50, 60, 80, 100, 120 und 150 cm
Depths of diaphragm walls	up to 100 m
Grab openings	2.80 m, 3.60 m, 4.20 m
Cutting width	2.80 m
Equipment	Cable dredger up to 120 tonnes



■ optimal range of application

Construction

Grab method

① Construction of guide walls to support the uppermost ground portions and to guide the grab
② Excavation of trench elements with a cable-operated grab (8 to 22 tonnes)
Securing of diaphragm walling with stabilising slurry (bentonite suspension)
③ Installation of joint systems or pre-cast elements as well as installation of reinforcement cage after the planned wall depth has been reached
④ Placing of concrete in tremie method. Simultaneously, the suspension is pumped out

Cutter method

- Construction of guide walls higher the secure the uppermost ground portions and to guide the grab
- Reaching of design depth with a grab suspended hydro cutter
- Creation of joints by interlocking of adjoining trench elements
- Removal of the loosened material together with the stabilising slurry through delivery pipes to the seperation unit
- Removal of the spoil
- Further steps: see grab system

Tests

- Position, twisting and verticality of the trench (inclinometers, ultrasound measuring devices)

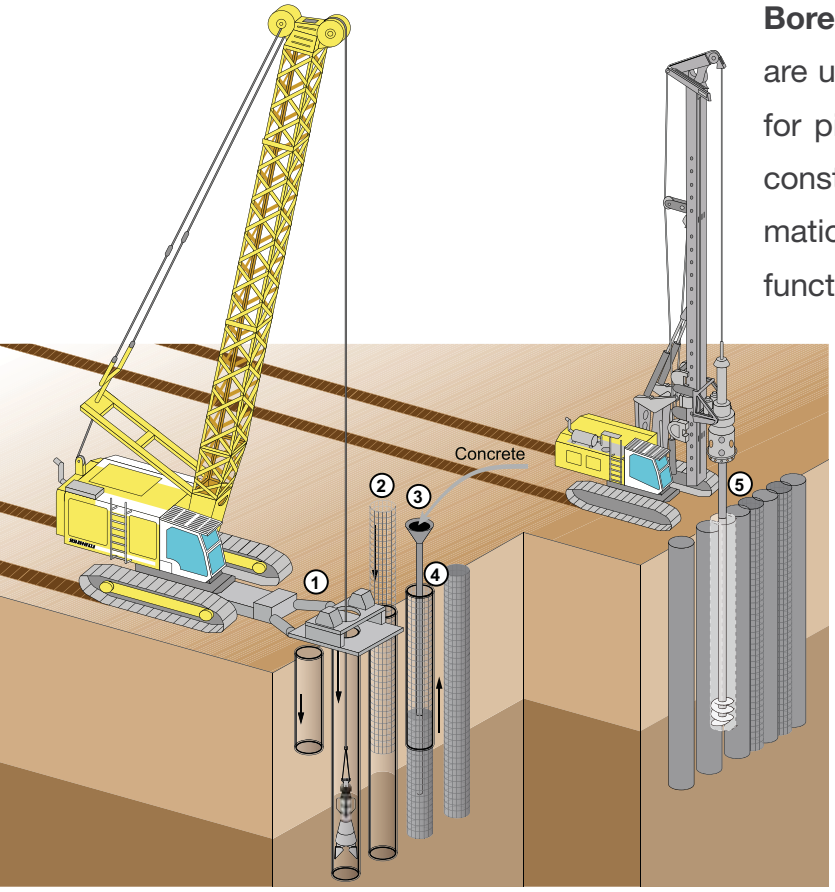
Applications

- Deep excavation pits with only small deformations, with or without anchors, water-tight; mainly used in inner-city areas
- Deep foundations of buildings or as urban elements

Works on the diaphragm walls, DC Tower, Vienna

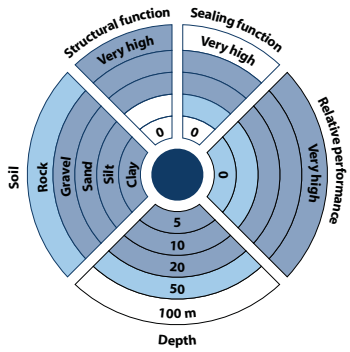
Reinforcing cage for an energy pile

2 | Bored piles



Bored piles with diameters from 40 – 150 cm are used as deep foundation elements and for pit stabilisation purposes. They can be constructed as individual piles, in group formation or as secant pile wall with a sealing function. The piles are fully cased, whereby either the grab or the rotary drilling system is employed. If the ground conditions permit it, the CFA piling method is applied.

Technical Data	
Grab and rotary drill method	Ø 60 to 150 cm
Rotary drill method with continous flight auger	Ø 40 to 120 cm
Equipment	Cable dredger up to 120 tonnes, drilling rig up to 100 tonnes



optimal range of application

Construction

Cased drilling

① Excavation with grab or auger secured by the well casing
② Installation of reinforcement cage
③ Placement of pile concrete (tremie method)
④ Removal of the well casing

Drilling

⑤ Stable soil conditions; excavation without well casing

- If required, support of the trench wall with water or supporting fluid (bentonite)
- Pressing of the concrete through auger pipe while extracting the auger
- The reinforcement cage is vibrated or pressed into the ground

Processes and variety of systems

- Grab method with base carrier and hydraulic oscillator
- Rotary drilling method and leader mounted drilling auger
- CFA method with continous fight auger

Tests

- Non-destructive, dynamic pile testing to determine continuity of concrete column

Applications

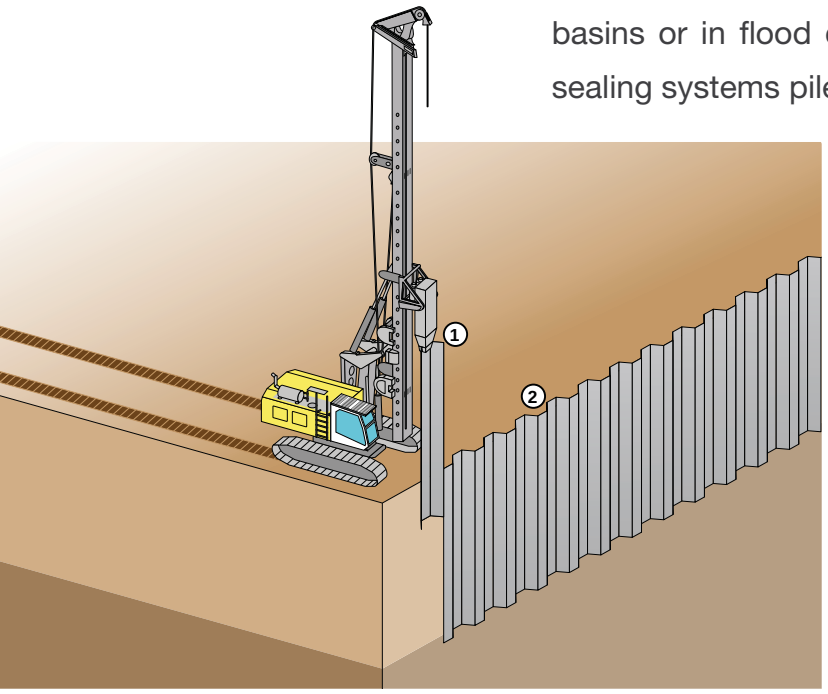
- Deep foundations in the whole construction area
- Pit stabilisation by means of a bored pile wall – with or without anchors – with spaced touching or secant bored piles
- Drilling for interpile sheeting, Berlin or Munich Type (steel girders with wood-prefabricated or shotcrete arches)


Bored pile works, Knapsack power plant, Cologne

Oval island with sheet pile walls, ÖBB bridge, Krems

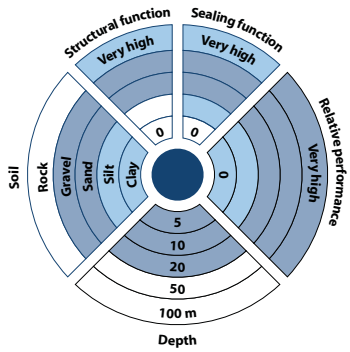
3 | Sheet pile walls

Sheet piling is used to stabilise level differences, to seal an area (against water or contaminated soils) and for pit stabilisation. They are also applied as structural elements in hydraulic engineering (quay walls, sewers, moles, port basins or in flood control). In combination with interlock sealing systems pile walls are nearly watertight.



Technical Data

Driving depth	up to 26 m
Sheet pile profiles	Larssen PU12 to PU32, Hösch AZ12 to AZ46
Interlock sealing system	with bitumen-based interlock filler (technically tight)
Pile drivers	adjustable high-frequency vibrators to minimise vibrations
Equipment	leader rigs up to 100 tonnes



■ optimal range of application

Construction

- In case of hard ground or firm soil support by jets of water at high pressure or pre-drilling with auger

① Driving of the sheet piles (if necessary insertion into the technically dense soil)

② Installation of walls by placing interlocked sheet piles next to each other

Processes and variety of systems

- Free riding cable-operated (crawler crane), partially guided systems (hydraulic excavator-boom) or leader mounted
- Impact driving or driving with vibrohammers
- Driving with normal or high frequency vibrohammers
- With or without anchors
- In case of difficult soil conditions or to minimize vibrations pre-drilling in the axis of the sheet pile wall (large-diameter drilling) possible or otherwise application of flush boring technique

Tests

- Vibration measurements

Applications

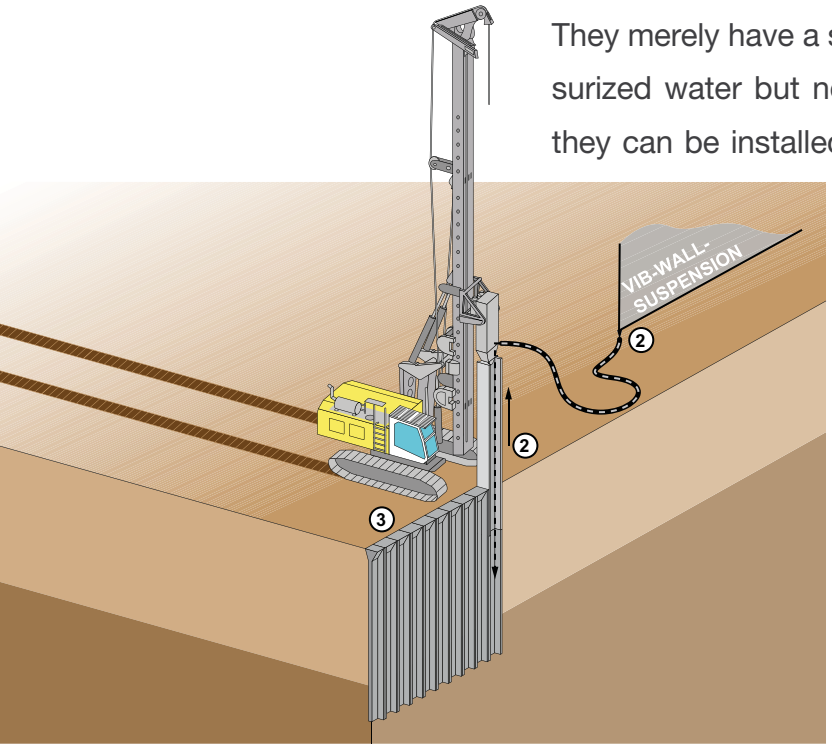
- Construction of bank installations and quay walls
- Enclosures for excavations in waters
- Sheet piling of different types of excavations and wells to provide sealing against ground water intrusion
- Supporting walls in the vicinity of roads, railway tracks or bridge abutments

H2-1 construction pit, Brixlegg, Tyrol

Dam sealing with VIB-walls on the River Inn

4 | VIB-walls

VIB-walls are vertical sealing elements primarily used for core seals in dams and for encapsulation of landfills to prevent contamination from spreading over to the ground water. They merely have a sealing function against horizontal pressurized water but no static function whatsoever. However, they can be installed in combination with static supporting elements such as berms and sheet pile walls. Furthermore, they are used for pit enclosures.



Technical Data

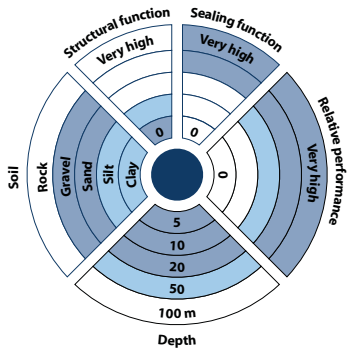
Slabs	HEM profiles 500 to 1000
Wall thickness	5 to 10 cm
Wall depth	up to 33 m
K-value of the sealing suspension	10^{-8} bis 10^{-10} m/s
Strength	0.5 bis 2.0 N/mm^2
Equipment	RTG leaders up to 120 tonnes

Construction

- Leader mounted high frequency vibrohammers vibrate slabs into soils where impact driving is possible
- ② When extracting the beam, slurry is filled into the hole that has been formed by the steel-clad base of the slab
- ③ A continuous wall is formed by an overlapping construction of individual slabs

Sealing medium
- Mix of clays, cement and additives. In-situ preparation or ready-made product

Preconditions
- Soil layers without obstacles where piling is feasible
- Limited driving depth depending on the type of equipment used



■ optimal range of application

Tests

- Feasibility check for ready-made products
- Suitability tests (referring to specific project)
- In-situ control and acceptance tests
- Pumping tests

Applications

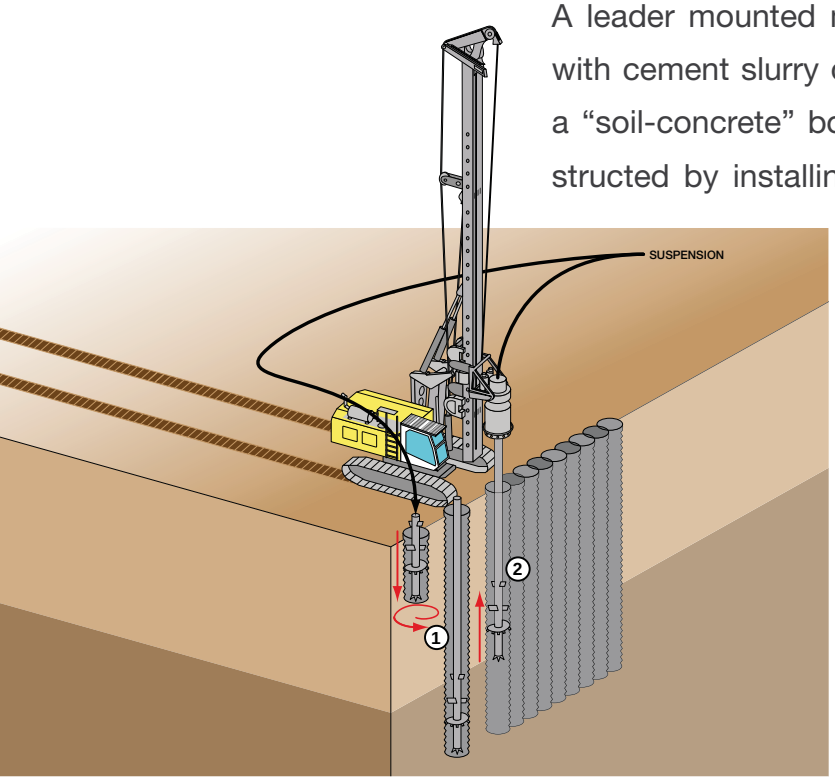
- Sealing of reservoir dams, back water of power plants
- Sealing of excavations
- Enclosures of landfills (e.g. chamber system)

Kalsdorf power plant, Gössendorf

Mixing device in action

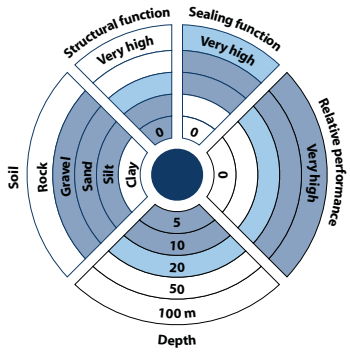
5 | Soil mixing system

The soil mixing method (deep ground stabilisation) is used to create vertical soil-cement columns in the ground. A leader mounted mixing paddle mixes the existing soil with cement slurry or special suspensions. Thus creating a “soil-concrete” body. A continuous cut-off wall is constructed by installing soil-cement columns in alternating sequence.



Technical Data

Columns (diameter)	50 to 80 cm
Drilling depths	up to 16 m
Compressive strength	2 to 10 N/mm^2 (depending on soil conditions)
Permeability	10^{-8} to 10^{-9} m/s
Equipment	RTG leaders up to 100 tonnes



■ optimal range of application

Construction

- Positioning of the mixing head and installation of suspension supply

① Boring of the mixing head while continuously adding suspension through the jet string until the final depth is reached

② When extracting the mixing head this soil-cement mortar is once more enriched and mixed with suspension

Processes and variety of systems

- With single or twin drill head (twin rotary drive system)
- Additional reinforcement elements can be installed in case of statical requirements

Tests

- Permeability, compressive strength, erosion resistance in cut-off walls

Applications

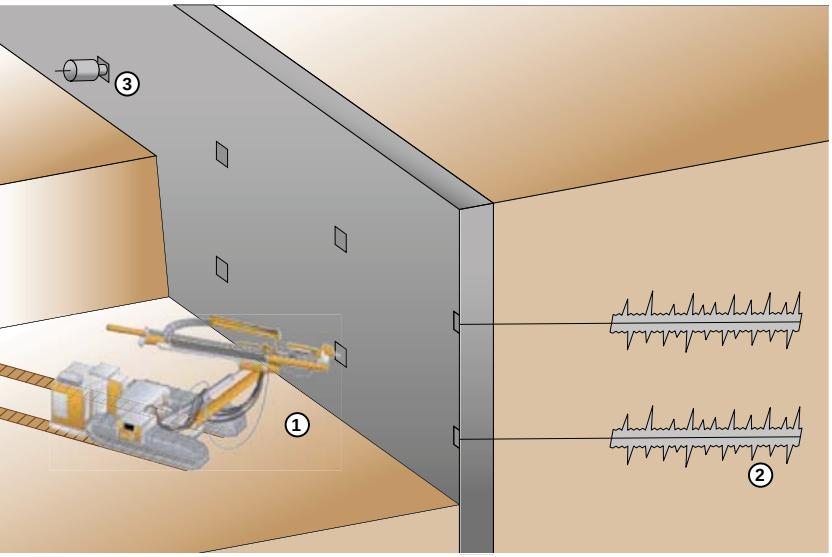
- Excavations in urban areas with or without sealing effect
- Construction of foundation columns
- Strengthening of soils with poor bearing capacity
- Sealing of landfills and contaminated sites (in-situ immobilisation)
- Sealing of earth dams with / without statical effect

Dam sealing with double paddle, flood protection, Lobau

Prestressing a stand anchor

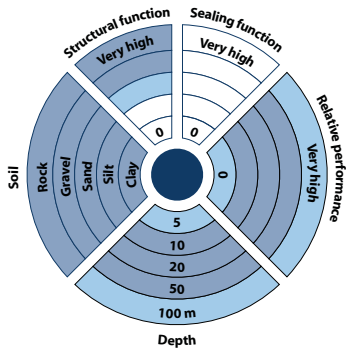
6 | Anchors

Anchors are used to transfer tensile forces acting on structures into the ground around or below that unit which is being built. They also reduce horizontal deformation. Primarily, they are used for temporary or permanent securing of excavation pits, embankments or rock walls (bar or strand anchors). Furthermore, they are used to prevent uplift and tipping and sliding of structures. In certain cases they also serve as deadman anchors.



Technical Data

Strand anchor	2 to 12 strands (250 to 2,000 kN working load)
Bar anchor	28 to 63 mm (250 to 1,500 kN working load)
Drilling diameter	108 to 219 mm (standard 139.7 mm)
Anchor length	up to 100 m possible
Equipment	mobile masts (0.25 tonnes) up to crawler mounted drill rigs (17 tonnes)



■ optimal range of application

Construction

① Uncased or cased drilling depending on the diameter of the anchor
- Installation of anchor and pressing of the bore hole
- In case of cased drillings: withdrawal of the casing

② Post grouting

③ Fixing of the anchor head construction and anchor pre-stressing

Processes and variety of systems

- Cased or uncased
- With rotation auger or rotary percussive auger (usually down hole hammer) depending on soil conditions
- Bar or strand anchors (depending on working load and anchor length)
- Temporary (less than 2 years) or permanent use (up to 50 or more years)

Tests

- Load cells
- Measuring of anchor forces
- During pre-stressing acceptance testing is implemented for individual anchors and groups of anchors

Applications

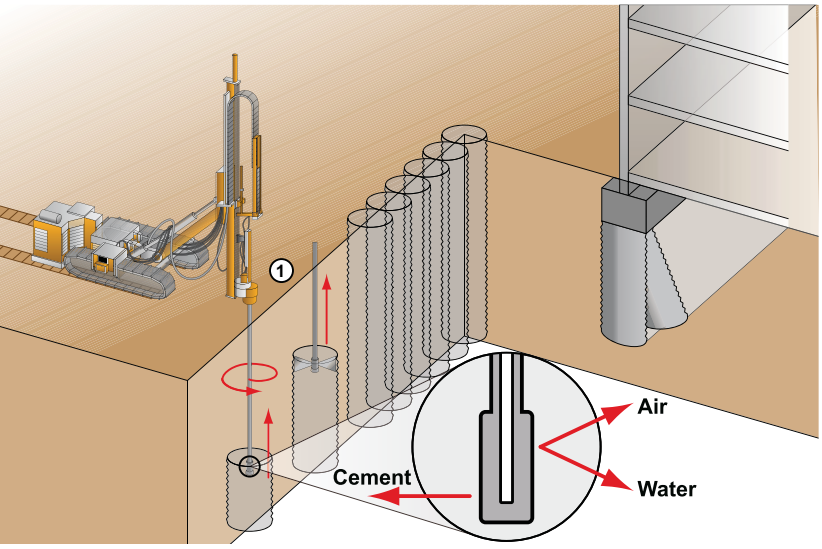
- Tie-back walls in any kind of excavation pit (diaphragm walls, bored piles, sheet pile walls, interpile sheeting)
- Temporary and permanent securing of rock walls and slopes
- Securing of buildings subjected to massive tensile forces (cable car stations, antennas, masts, bridges, etc.)
- Uplift protection (e.g. sediment tanks)

Anchor manufacture, Nassfeld, Carinthia

Temporary pit support system with jet grouting, Hasengasse, Vienna

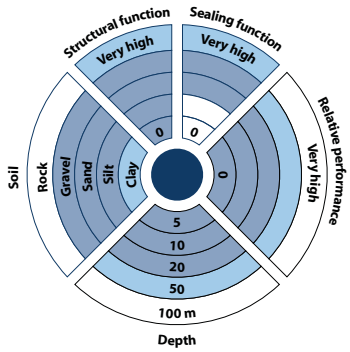
7 | Jet grouting

Jet grouting (high pressure grouting) is employed for strength improvement. It uses a high pressure jet to cut the natural soil, to remove fine soil grains and to mix and partially replace the soil with cement.



Technical Data

Drilling depth	up to 30 m
Diameter	80 to 300 cm (depending on soil conditions)
Cutting pressure	300 to 600 bar
Compressive strength	2 to 20 N/mm^2 (depending on soil conditions)
Permeability	10^{-8} to 10^{-9} m/s
Equipment	mobile masts (0.25 tonnes) up to crawler mounted drill rigs (17 tonnes)



■ optimal range of application

Construction

- A small diameter bore hole is drilled with jet strings down to the design depth employing uncased rotation drilling and flush drilling
- ① The withdrawal rate is kept constant and the soil is cut by means of a rotating jet (horizontal water and / or suspension jet with / without compressed air) and simultaneously mixed with cement suspension

Processes and variety of systems

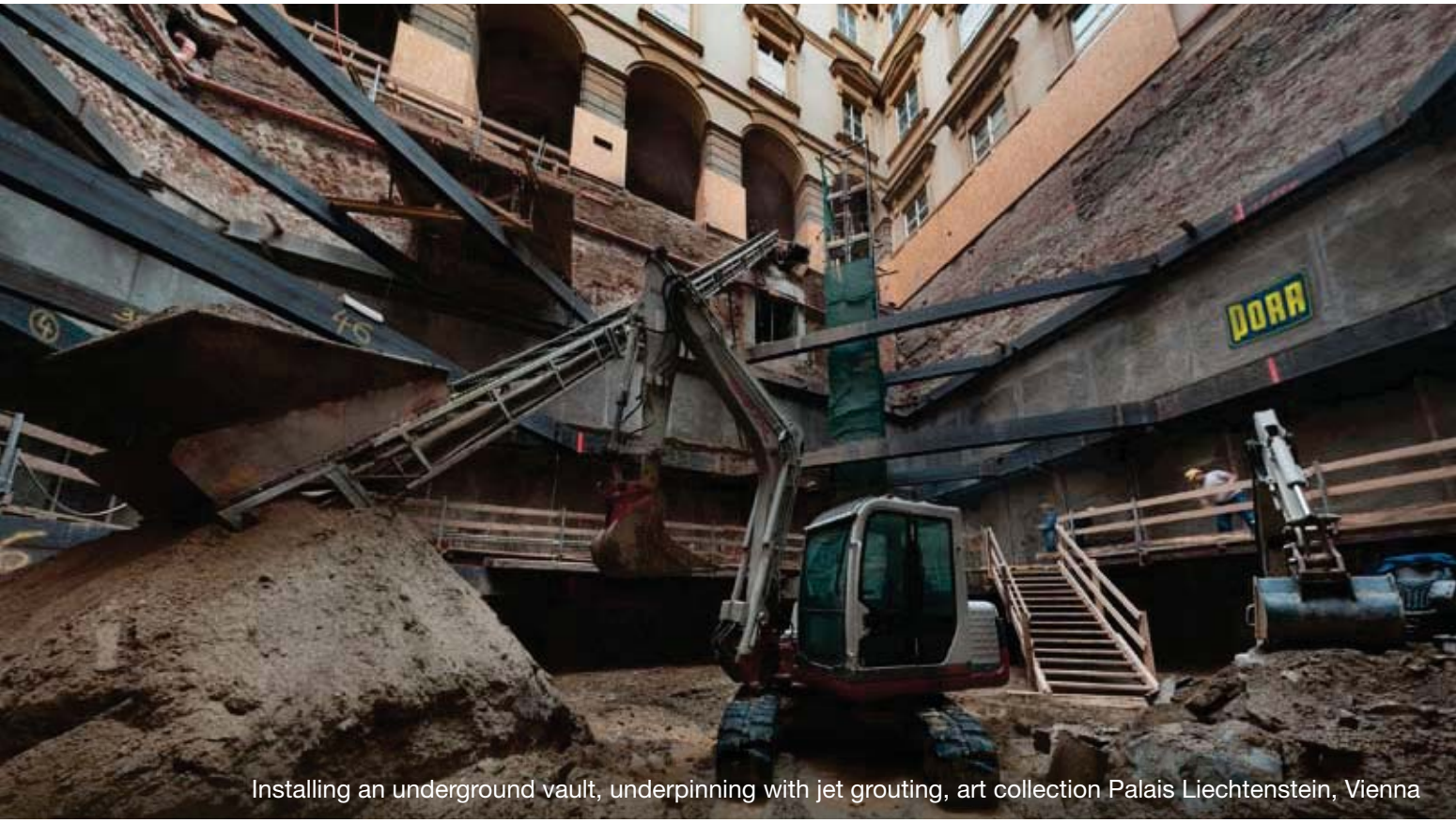
- Simplex-Method: the jet cuts the soil and mixes it with cement grout
- Duplex-Method: the jet cuts the soil and mixes it with cement grout and compressed air
- Triplex-Method: the jet cuts the soil with water and compressed air and mixes it with cement grout

Tests

- Trial columns
- Continuous monitoring of suspension density and spoil return
- Automatic recording of jet grouting parameters
- Measuring of temperature in the center of the column to determine the diameter and cement content of the column
- Continuous nivellements of adjoining buildings

Applications

- Underpinning of existing buildings and foundation renovation works
- Deep foundations, bracing and stiffening of foundations
- Sealing elements (dam sealing, walls of clumns and lamellae, joint sealing)
- Impermeable bases for excavations ground water outlets

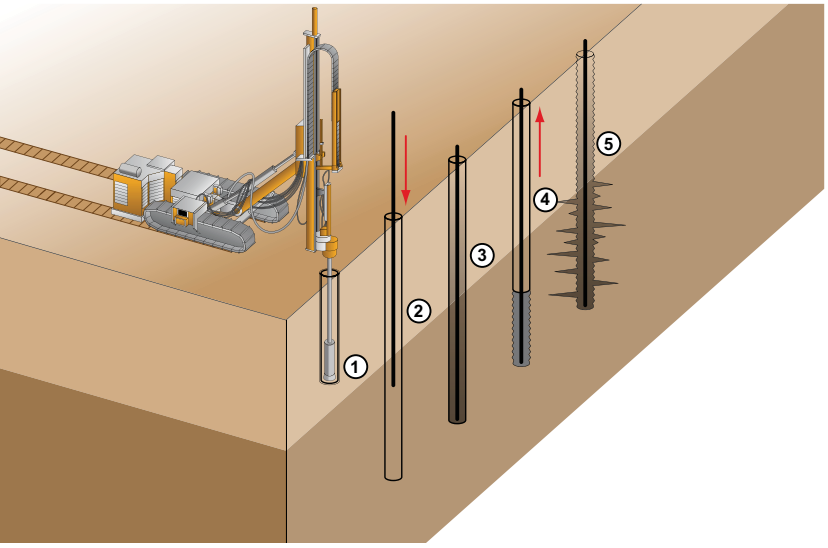


Installing an underground vault, underpinning with jet grouting, art collection Palais Liechtenstein, Vienna

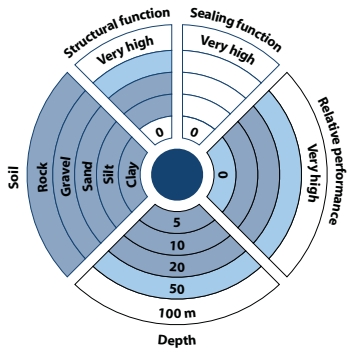
Mico piles for bridge foundations

8 | Micro piles

Micro piles are typically drilled or driven piles up to a diameter of 250 mm and individual bearing capacities of 1,500 kN. They are made of steel, concrete, wood or cast iron and they are able to transfer loads through shaft friction into deeper soil layers.



Technical Data	
Drilling depth	typically up to 30 m (larger depths possible)
Diameter	30 to 250 mm
Bearing capacity	100 to 1,500 kN
Equipment	mobile masts (0.25 tonnes) up to crawler mounted drill rigs (17 tonnes)



■ optimal range of application

Construction

Cased

① Cased or uncased drilling, as appropriate for the diameter of the pile
② Installation of the load bearing element
③ Filling of the casing with cement grout
④ Removal of the casings
⑤ Post grouting of the pile with cement grout in order to increase shaft friction area

Driven

- The first casing section is equipped with a drive shoe and driven with double-acting hammers
- The following casing sections are placed into the conic socket of the preceding casing
- Final pile depth is determined on the basis of the penetration resistance (shaft friction and point bearing pressure)

Tests

- Tension and pressure tests possible

Applications

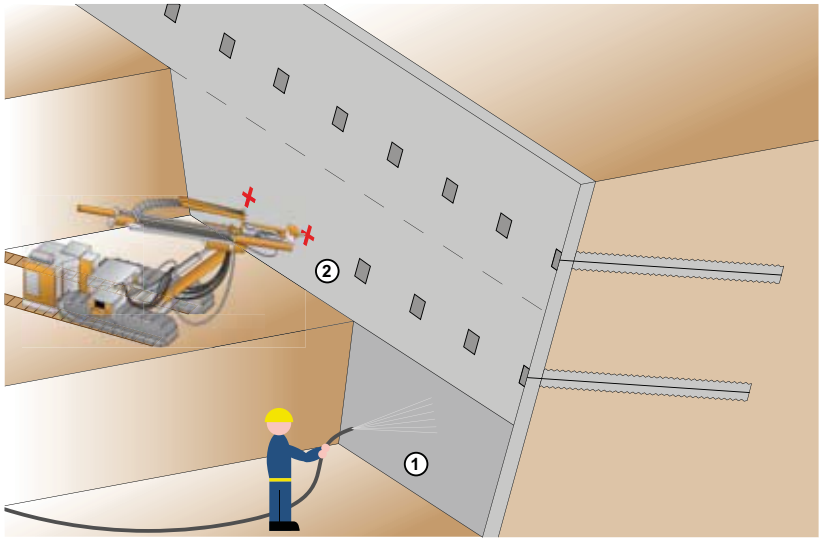
- Underpinning of existing buildings
- Deep foundations (construction of bridges, roads, sewers and structural engineering projects, …)
- Uplift prevention
- Securing of deep excavations (tubular pile walls)

Tension piles for underwater structures, Ashta power plant, Albania

Securing of deep excavation, T-Mobile, Vienna

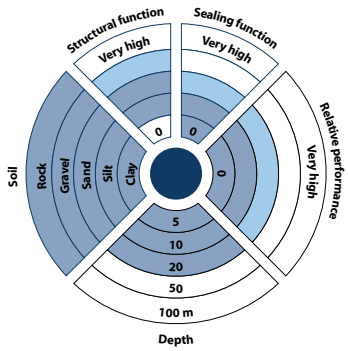
9 Soil nail walls

Soil nailing is based on the principle of installing reinforcing bars (injection anchors) into the soil in order to increase tensile and shear strength. Additionally, the front soil side of the secured excavation is furnished with a shotcrete shell. Together with the naturally occurring soil a composite body is formed whose load bearing capacity is the same as in a gravity wall, whereby the ground acts as a structural element.



Technical Data

Shotcrete	shotcrete layers (up to 25 cm) in dry-mix or wet-mix procedure
Nail grid	approx. 1.50 x 1.50 m
Nail forces	100 to 250 kN working load
Equipment	crawler mounted drill rig up to 8 tonnes for nailing



■ optimal range of application

Construction

① Excavation, section by section, depending on the stability of the soil mass
① Securing of the exposed slope by means of reinforced (mat reinforcement) shotcrete shell (approx. 10 to 25 cm)
② Execution of drilling, installation of nails and grouting of voids
- After hardening, the nail head and the shotcrete shell are firmly connected and the nails are fastened
- Excavation of the next horizon

Processes and variety of systems

- Tension and pressure tests possible
- The soil is treated directly during excavation. High flexibility is achieved on account of the use quickly hardening shotcrete
- Injection anchors transfer the tensile force into the ground; anchoring is effected through suspended friction of the pressure-grouted body (cement grout) with the natural ground
- Application of flexible and small units
- Temporary (less than 2 years) or permanent stabilisation (up to 50 or more years)

Tests

- Shotcrete tests
- Tension test of soil nails

Applications

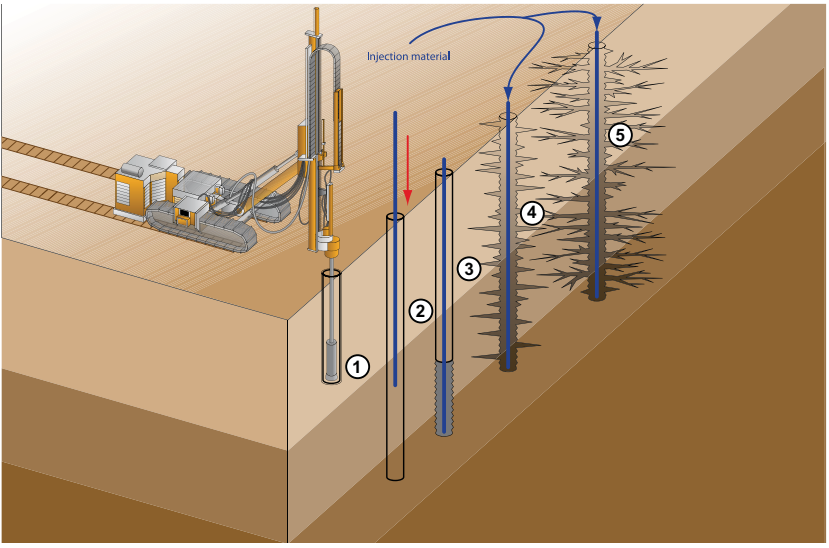
- Securing of slopes and excavations
- Slope stabilisation at streets or railway lines

Construction of soil nail walls, Campina Predeal

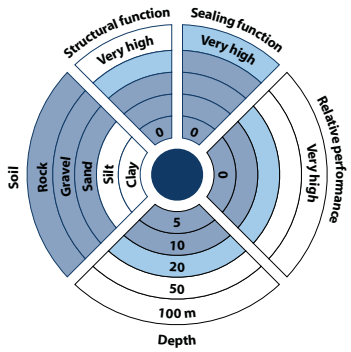
Interior view of injection container with six pumps

10 Injections

When carrying out **injections** suspension or a hardening material is grouted through bore holes into water or air filled voids in soils, rocky material or in buildings. Injections are used to seal or consolidate soil or building structures.



Technical Data	
Pumping performance	low pressure (1 bar) to high pressure (100 bar)
Delivery rate	fully adjustable from 0 bis 30 lt/min
Drilling depths	possible up to 100 m
Equipment	fully automatic injection container with up to 6 pumps



■ optimal range of application

Construction

① Driving of the bore hole (drilling method)
② Installation of injection pipes
③ Refilling of the annular space with an adequate slurry, withdrawal of the casing
④ Injection of the mix into the subsurface in keeping with the injection system (packe, sleeve pipe, etc.)
⑤ If necessary, repeated post grouting for more efficiency

Processes and variety of systems

- Rock, building and alluvial injections
- Injection agent made of cement grout, solutions, emulsions, resins, polyamides, etc.
- Filling injection soil fracturing, compaction injection
- Consolidation injection or sealing injection

Tests

- Trial areas

Applications

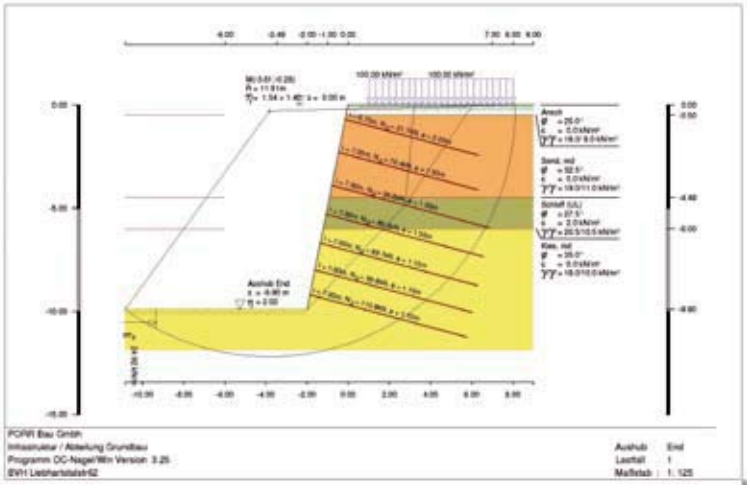
- Subsurface injections for the creation of waterproof shields below dams and barriers
- Sealing injections and fensioning-injection for water galleries and shafts
- Sealing injections to prevent incursions of water
- Injections for slope stabilisation and to prevent sliding
- Improvement of the load bearing capacity of foundations
- Injections to immobilise contaminants

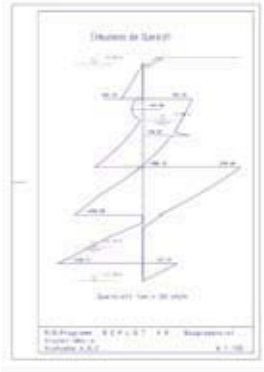
Dam reconstruction with injections, Feldsee, Carinthia

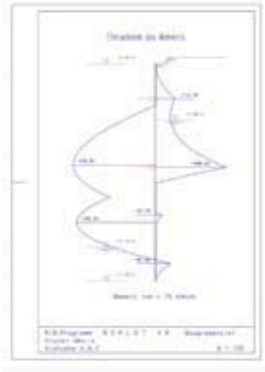
Pit design

11 | Design

Precise design and planning are the prerequisites for the technical and economical implementation of a building project.

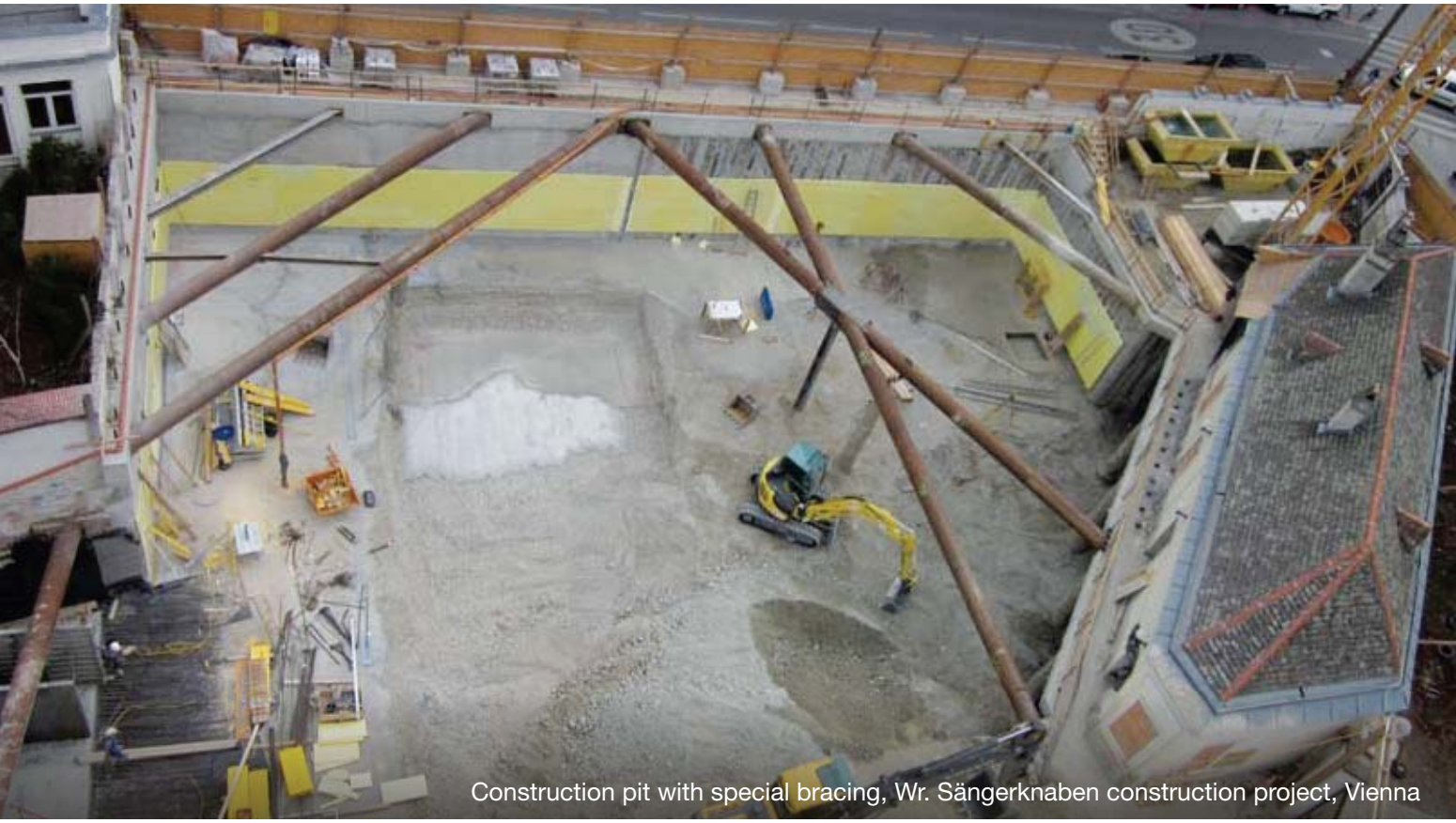






Designers have to carefully consider all the technical options available. They have to take into account their clients' demands as well as on-site conditions and the specific geological situation. This requires know-how and expertise that can only be gathered over the years.

The specialist foundation department of the PORR Group has highly qualified engineers with many years of experience in foundation engineering working for them. Consultations with clients in the tender phase of a project, special solutions for different projects such as excavations, foundations, slope stabilisation or the encapsulation of contaminated sites rank foremost in our department. We offer our clients technically sophisticated and cost-effective solution packages including building preparation and realistic handling of statical operations.

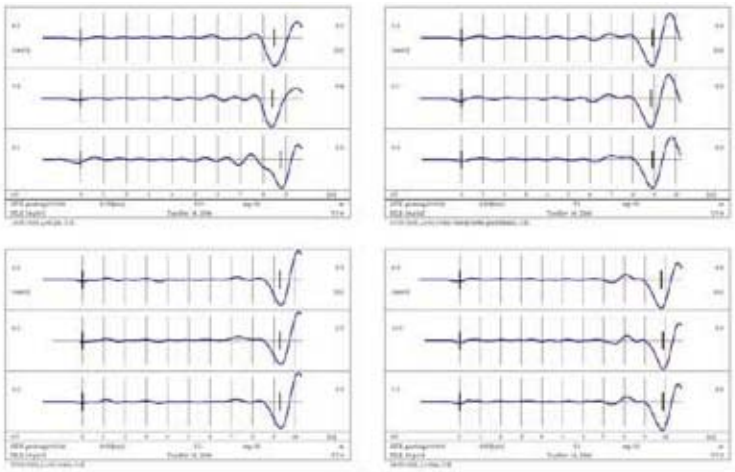


Construction pit with special bracing, Wr. Sängerknaben construction project, Vienna

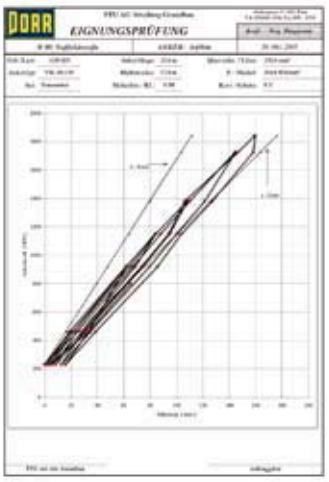
Load testing of a large-diameter pile

12 | Quality assurance

Quality assurance in foundation engineering is conducted during the whole construction process. Having incorporated internal quality assurance procedures it also forms part of the acceptance procedures for completed constructions.



Integrity measurement, dynamic piles



Suitability test for permanent anchor

In order to guarantee our clients high quality standards PORR AG is certified to DIN EN ISO 9001:2000.

All working stages and processes are documented in our Standard Operating Procedure. Providing sustainable and high-quality services for our clients is a top priority of our company.

Among others the following quality control methods are applied:

- applicability testing
- receiving controls of the materials used (e.g. concrete, cement, binding agents) through standardised testing methods
- continuous monitoring of construction processes and the chosen construction parameters with self-developed software products (e.g. for bore piles, diaphragm walls, jet grouting)
- monitoring of drilling deviations (e.g. inclinometer measurements)
- quality control of finished constructural elements (e.g. TNO-check, diameter determination in jet grout columns in co-operation with scientific institutes, compressive strength testing for bore cores)

CERTIFICATE

DQS GmbH
Deutsche Gesellschaft zur Zertifizierung von Managementsystemen

hereby certifies that the company

Porr Bau GmbH
Absberggasse 47
1100 Vienna
Austria

with the organizational units/sites as listed in the annex

for the scope

Planning, design, development, execution and utilisation/operation of projects in the fields of building and industrial construction, civil engineering, specialised civil engineering, underground construction, power plant construction, railway construction, catenary systems and overhead transmission lines, earthwork projects, road construction, infrastructure and environmental protection

has implemented and maintains an

Quality and Environmental Management System

Audits, documented in a report, have verified that this management system fulfills the requirements of the following standards:

ISO 9001 : 2008
November 2008 edition

ISO 14001 : 2004
November 2004 edition

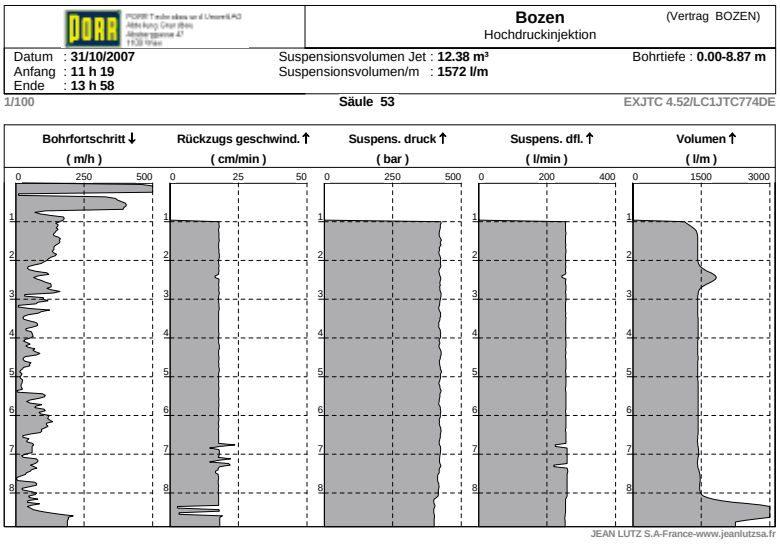
This certificate is valid until	2012-10-12
Certificate Registration No.	494216 QM08 UM
Excerpt from Certificate Registration No.	005433 QM08 UM
Frankfurt am Main	2011-06-14

Ass. ur. M. Drechsel
Dipl.-Ökn. H. Boge
MANAGING DIRECTORS
D-60433 Frankfurt am Main, August-Schanz-Straße 21

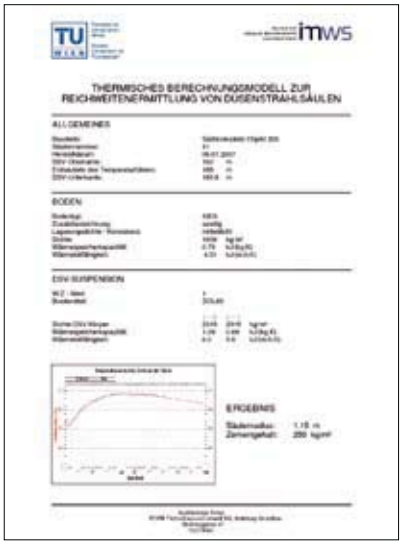
Quality and environmental management system

Pile load test, Osterberg

Innovative foundation engineering solutions at PORR include using test piles to optimise the foundations and determining the diameter of jet columns using Tempjet.



Quality assurance when manufacturing jet grouting columns



Diameter determination in jet grout columns using patented Tempjet method

Test piles for the optimization of deep foundations

Tension piles are normally required to accommodate the stresses in static pile load tests. When carrying out a load test with the “Osterberg Cell” (O-cell), the hydraulic press attached to the reinforcing cage uses the pile element above the press as a reaction beam and the one below the press as a pressure pile. This means that no separate tension piles are needed, thereby saving time and money.

Diameter determination in jet grout columns with Tempjet

The Tempjet method patented by PORR detects the diameter in the column's core by measuring the progression of the setting temperature using software programmed especially for this purpose. This eliminates the need for the time and cost-intensive stripping of test columns. This new method can also measure the content of cement, thereby producing a forecast for the strength which needs to be reached.

Dynamic pile load test, Gönyü, Hungary

13 | Health & Safety

Occupational health and safety is increasingly becoming a factor and sign of quality in process descriptions. This is also why it is certified to DIN EN ISO 9001:2000 at PORR.

BUREAU VERITAS
Certification

Enterprise Certificate

PORR

Allgemeine Baugesellschaft – A. Porr AG
„Arbeitsgruppe SCC"
A-1120 Wien, Absberggasse 47

Bureau Veritas Certification certify that the
Safety Management System
of the above organisation has been audited and found to be in accordance with the requirements of the management system standards detailed below

Standard
SCC**:2007

scope of supply
all construction activities of the above mentioned enterprise
in the working group SCC
with the branches / subsidiaries quoted on the attachment

Original issue date: 2002
Subject to the continued satisfactory operation of the organisation's Management System, this certificate is valid
From: 00/00/0000 until: 00/00/2014
Date of Revalidation audit: 00/00/2014
Further clarifications regarding the scope of the certificate and the applicability of the management system requirements may be directed to the issuing office of registration

Issue number: 0123-004-01-001

Bureau Veritas Austria GmbH is provided a certification agency for quality management system based on EN ISO 9001, safety management system based on ÖNORM S 2030 and certification of personnel based on EN 45013 by the Austrian Federal Ministry for Economic Affairs and Labour and Austrian Accreditation Council for Economic Affairs and Labour according to Regulation (EC) 765/2008 Annex 2 (2)

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has implemented and maintains an

Occupational Health and Safety Management System

An audit, documented in a report, has verified that the occupational health and safety management system fulfils the requirements of the following standard:

BS OHSAS 18001 : 2007

This certificate is valid until	2012-10-12
Certificate Registration No.	494216 BSOH
Excerpt from Certificate Registration No.	005433 BSOH
Frankfurt am Main	2011-06-14

Ass. a. M. Dietzel — Dip.-Ing. Meyer
MANAGING DIRECTORS

D-60433 Frankfurt am Main, August-Schanz-Straße 21

DQS GERMANY
IQNet
CERTIFICATION OFFICE GERMANY

TGA-ZM-03-90

Staatspreis
Arbeitssicherheit
2009

Enterprise certificate

Occupational health and safety management system

State prize for occupational health & safety

In order to meet requirements the PORR Quality Management department launched a dedicated programme whose goal is not only to protect workers technically, but also to facilitate an ongoing change in the staff's attitude to promote awareness regarding one's own health and safety.

Since the broad product palette offered by PORR means that the requirements and health risks vary widely across the staff, the company offers an array of different measures to avoid illness and promote good health. These measures include the “PORR Health Day”, sports courses, a company coach and regular check-ups by the company medical officer.

Occupational health and safety on construction sites is evaluated through regular checks by our safety officers enabling us to maintain high safety standards with the aim of „zero accidents“. Apprentices are sensitised to the topic of health and safety during their training – an educational concept which has already been awarded the “State Prize for Occupational Health and Safety”.

„Safety first“ – programme to reduce absence caused by accidents

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