CA “Interbudmontazh” performs construction and installation of various underground facilities:

- Tunnels for various purposes in the areas of high seismicity and complicated geological conditions;
- Underground engineering and transport networks;
- Bearers of structures and buildings.

The Company carried out the following projects of underground structures construction:

- more than 32 km of tunnels of different diameter are:
  - 29 km of tunnels in Ashgabat with the arrangement over the entire length of the concrete jacket
  - 1.8 km of completed upper ledge of the Beskyd tunnel
  - 1.5 km of completed subway line in Moscow
- 25 technological chambers built using method of "slurry wall"
- 2 underwater cablings built under the bed of the Karakum River
- 4 pedestrian underground crosswalks for 6-8 exits have been built.

Design works are carried out by specially created institute "Ukrspetstunnelproekt", which was formed from the specialists of the state design institute, which has 50 years of experience in designing objects of underground construction.

The company is a member of the International Tunnelling Association (ITA) as well as a member of the International Association of Specialists for Horizontal Directional Drilling.

Modern equipment from world producers and high level scientific and technical training, allow the company to quality and timely implement large-scale construction projects.

Construction Association “Interbudmontazh” is known for its professionalism, quality, speed and reliability of performance. The company is certified according to the international quality standard ISO 9001:2008 (certification carried out by TUV Thuringen, Germany).
TBM EPB-6.250 - 2 pcs.
TBM EPB-3.000 - 1 pc

TBMs with EPB manufactured by "Herrenknecht AG". The principle of operation is to support the face by pressure developed soil, thus avoiding lifting or precipitation of surface. Pressure of hydraulic jacks, transmitted by supporting wall, impacts the ground near the face. Foaming additives fed to the bottom zone are used as the plasticizer, the pressure is controlled by sensors located on the supporting wall and the screw conveyor.

Rolling stock
For transportation of rock, diesel locomotives manufactured by "Shema" are used. The train consists of a diesel locomotive, carriages for the ground with capacity of 5 and 10 m³, car for a solution with forced mixing during transport, a cabin car for transportation of work shifts, transport bogies for transportation of goods.

Power-generating equipment
Of great importance is the continuity of workflow that provides backup power supply system. To this end, there are three diesel generators "Krauter" with transformers 0.4/10 kV, power 1250 kVA for shields EPB-6.250 and a capacity of 800 kVA for shield EPB-3.000.

Life support equipment
Ventilation and cooling system supplies cool air to the TBM and chilled service water required to operate the complex.

Surveying software
TBM complexes equipped with a navigation system with output in real-time information on the exact position on the monitor panel. Surveying service determines the position of the shield on the computer, compares with the program calculations and provides guidance for the operator to move the shield.
THE PRODUCTION BASE OF UNDERGROUND CONSTRUCTION

SHIELD DRIVING

- **Lifting - transport equipment**
  - Gantry crane "Joseph Paris" capacity 120 t .............................. 1 pc.
  - Caterpillar cranes DEK251, MKG25B capacity 25 t .............. 7 pcs.
  - Gantries capacity 20 t KKTC-20, KK-20 ............................... 2 pcs.
  - Crane capacity 32 t KKC-32 .............................................. 1 pc.
  - Gantries capacity 32 t KCK-32/5 ........................................ 2 pcs.
  - Tower cranes capacity 8 t KB-308 ...................................... 1 pc.
  - Cranes on the pneumatic drive KC 5363 capacity 36 t ........... 3 pcs.
  - Bridge cranes capacity 10t and 5t EKKE .............................. 4 pcs.

- **Machinery for construction "wall in the ground" type B-180 HP and B 125 "Sasagrande" company**

- **Earthmoving equipment**
  - Crawler excavators on the pneumatic drive ......................... 20 pcs.
  - Bulldozers and tractors ..................................................... 13 pcs.
  - Graders .............................................................................. 2 pcs.

- **Drilling rigs**
  - Complex of horizontal directional drilling "Robbins" model CMS 9015 TMSC (USA) ......................................................... 1 pc.
  - Complex of horizontal directional drilling "Universal" model UNI 160x240 (USA) ......................................................... 1 pc.
  - Drilling rig LBU 50-04 (Russia) .............................................. 1 pc.
  - Drilling rig URB ZAZ 02 (Russia) .......................................... 1 pc.
  - Installation for beam drilling ULB 130 (Russia) ..................... 2 pcs.

  **Location systems:**
  - DigiTrak SST "Digital Control Incorporated" (USA) ......................... 1 pc.
  - Paratrak2 "Inrock" (USA) ..................................................... 2 pcs.
CIFA formwork complex

- Mechanized formwork for arrangement of monolithic reinforced concrete shirt in tunnel with inner diameter of 3 m, four-part, telescopic total length of 20 m, concrete formwork construction allows both straight sections and with curves.

- Formwork for concreting of the separation wall in the tunnel with inner diameter of 3 m. The four-section 20 m long. Used in conjunction with formwork shirt.

- Mixer for transporting concrete in a tunnel with a discharge into a hopper or other concrete mixer. Drum capacity of mixer - 4 m³.

- Self-propelled crane for concrete placement. It has a telescopic boom and articulated swivel steel concrete pipeline.

- Mobile mechanized formwork with a manipulator for the distribution of concrete of "CIFA" company (Italy), is intended for the arrangement of monolithic shirts and tray portion in the tunnel with inner diameter of 5.4 m. The formwork consists of 4 sections 4.5 m each. The total length of the formwork is 18 m.
Production facility for the production of reinforced concrete ring lining for tunnels with carousel production technology with capacity of 90 th. cubic m per year.

Tunnel lining with outer diameter of 3.5 m and 6.0 m is assembled of the rings of universal shape to provide rotation of tunnel in plan and profile. The width of the rings is respectively 1.0 m and 1.2 m. Precision blocks are made of waterproof concrete using formwork of "Cherezola" (Switzerland). On the side surfaces the blocks are equipped with glued rubber waterproofing seals produced by company "Phoenix" (Germany).
Equipment for drill-and-blast method of tunneling:

- Self-propelled drilling rig Sandvik........................................ 1 pc.
- Tunnel excavator Liebherr .................................................. 1 pc.
- Shotcreting machine CIFA .................................................. 1 pc.
- HD Hydraulic Hammer.......................................................... 2 pcs.
- Tunnel loader Liebherr ....................................................... 1 pc.
- Tunnel lift Normet................................................................. 1 pc.
- Tunnel dump MoA3............................................................... 1 pc.
- Mixer truck Titan................................................................. 1 pc.
- Stationary concrete pump PC............................................... 1 pc.
- Solution pump Putzmeister................................................... 1 pc.
- Mobile compressor Dolgakiran.......................................... 1 pc.
- Drilling rig.......................................................... 1 pc.
- Fan installation............................................................... 2 pcs.
This project includes the construction of two station complexes:

- "Rasskazovka" and two running tunnels with total length of 3240 m
- "Michurinsky Prospect - 1" with two tunnels with length of 1275 m and complete engineering support.

Station under construction are included in Kalinin-Solntsevskaya subway line, which will connect together the eastern, central and south-western districts of Moscow. At the station "Rasskazovka", there are 2 underground lobby and ways out through the underpasses.

Station "Michurinsky prospect" is built on a steep slope and will have a split-level interchange transitions.
PROJECT
CONSTRUCTION OF THE LINE SECTION OF THE MOSCOW METRO

Volumes of construction:

- Running tunnels 6m TBM excavation - 3662 m (prefabricated concrete - 22 410 m³)
- Development of soil – 264 711 m³
- Arrangement of track structure – 2.5 km
- Arrangement of cladding structures – 35 196 m³
- Installation of metal fastening pits 6579 t

- Construction of stations (monolithic reinforced concrete) – 143 100 m³
- Backfill – 61,225 m³
- Installation of the permanent way – 1.16 km
- Design and installation of steel structures – 2930 t
- Arrangement of cladding structures of piles 1020 – 4500 m³
- Base piles station complex 1020 – 9346 m³
Construction technologies:

- Tunneling with mechanized TBM tunnel complexes
- "Wall in the ground" – arrangement of enclosing structures
- "Secant and tangential piles" – arrangement of enclosing structures
- "Jet technology" – ground stabilization
- Dewatering
- "Auger piles" – arrangement of counterweight for TBM takeout and pile base for buckle plate
- "Anchoring" – fixation of enclosing walls of pits.
The construction project is a system of surface and underground structures, allowing to solve the problem of life support in Ashgabat, namely:

- reduce the level of groundwater in the most flooded part of the city;

- improve the reliability of urban drainage systems, water supply, electricity, communications, and improve the conditions of their operation;

- more efficient use of surface water and groundwater by increasing the amount of water suitable for irrigation.
CONSTRUCTION OF DRAINAGE AND COMMUNICATION TUNNEL

The volume of construction:

- The total length of the tunnels ........................................... 31 520 m
- Drainage and communication tunnel with a diameter of 6 m .......... 17 700 m
- Two waste tunnels with diameter 3.5 m .................................. 13 820 m
- Technological chamber ............................................................. 24 pcs
- The length of the "wall in the ground" ...................................... 2 500 m
- Radial shaft wells ................................................................. 76 pcs
- Radial drains - length ............................................................ 32 000 m
- The total amount of concrete ................................................ 336 000 m³

Construction of drainage and communication tunnel is carried out in an area of high seismicity (up to 10 points on the Richter scale) with mining complexes with EPB produced by “Herrenknecht” AG.

Construction of process chambers with the "slurry wall" method is carried out by excavator "Casagrande". Trenchless technologies are conducted by Horizontal directional drilling (HDD) with rig "Robbins". Pipe filters of polymeric materials, that are resistant to corrosion, are installed into drains of 200 mm diameter.
PROJECT
CONSTRUCTION OF DRAINAGE AND COMMUNICATION TUNNEL
Construction of two cablings under Karakum river (Turkmenistan) is completed.
The excavation was conducted by shield complex of 6 m in diameter. Transitions are designed for the passage of sewage and drainage water under the river bed to the treatment plants.
4 tubes of 1200 mm diameter. Length of tunnel junctions - 412 m.
In order to improve railway traffic between Eastern and Western Europe via the existing Beskyd railway tunnel located on the 5th Cretan international corridor in the area of Beskyd-Skotarske, construction of a new double-track tunnel shall be performed.

The main technical indicators:

- Length of the tunnel ......................................................... 1764.5 m;
- Width of the tunnel (in the light) ........................................ 10.5 m;
- Height of the tunnel (in the light) ........................................ 8.5 m;
- Niches in the tunnel ......................................................... 49 pcs;
- Chambers in the tunnel ..................................................... 12 pcs;
- Connecting cross-passages (with the old tunnel) .............. 3 pcs;
- Number of tracks ............................................................. 2 pcs;
- Capacity of the tunnel ...................................................... 92 pairs per day;
- Volume of excavated ground ............................................. 211 440 m³;
- Metall temporary lining .................................................... 2 565 tonnes;
- Monolithic concrete temporary lining .............................. 32 374 m³;
- Reinforcement permanent lining ...................................... 4 741 tonnes;
- Monolithic concrete permanent lining .............................. 49 414 m³;
- Waterproofing membrane ................................................ 66 925 m².
Tunnel drilling and blasting is carried ledge after ledge. At first, excavation is carried out on upper ledge (calotte) for the entire length of the tunnel, and then the lower ledge is being excavated.

When excavating calotte, temporary support of the excavation is arranged with arches with shotcrete coating. The penetration of the lower ledge is carried out with the temporary fastening anchors and shotcrete on reinforcing arches.

Concreting of permanent lining is carried out using a mobile formwork.
The basis of personnel policy of the company is to attract the best specialists in all areas of its activity, permanent training and professional upgrading.

Currently **3 581** people work in the company, including:

- **540** – technical and engineering personnel
- **3 041** – workers
- **1** – Doctor of Science
- **2** – PhD (Philosophy Doctor)
- **7** – awarded the title “Honored Builder”

In underground construction it is involved **2 400** professionals:

- **210** specialists have long lasting experience in the metro construction in Kiev, Kharkov, Dnepropetrovsk, Moscow.
- **518** specialists have experience in the metro station construction.
- **328** professionals for a long time working on the underground objects construction.

The employment period of the main specialists in all divisions is **12-35 years**, the average grade of workers of the major skills - V.

All company personnel involved in the maintenance of tunnel complexes was trained in Germany (on the basis of the company Herrenknecht AG).

The company established a training center for mandatory staff training. The center’s programme covers the entire spectrum of professions for workers and engineers.
DESIGNING
Design Institute "Ukrspetstonnelproekt" is part of Construction Association Interbudmontazh, registered in 2003. The institute is formed from "Ukrmetrostonnelproekt" and "Soyuzdorproekt" specialists of state design institutes, which have for more than 50 years served as the leading design organizations of the former USSR. Design Institute includes 187 employees.

"Ukrspetstonnelproekt" performs the full cycle of design and survey works from laboratory tests of building structures to release of project - estimates documents and working drawings up to date with the latest achievements in the field of architecture, construction of buildings and computer technology.

Given the ever-increasing volume of work, the Institute opened a representative office in the Russian Federation.

Currently, more than 30 projects are carried out in Russia, Ukraine, Turkmenistan

The Institute develops projects including:

- underground structures;
- tunnels for different purposes in a variety of engineering-geological conditions, including extremely difficult (seismic, karst, etc.), in structures with spans of 20 m or more, and the cross section area of up to 430 m²;
- underpasses and structures;
- bridges and overpasses;
- railways and roads with infrastructure;
- residential and office complexes.
Scheme of long-term development of high-speed underground transport TÜRKMEN TİZLİ YER ASTY DEMİR YOL ULGAMY up to 2050

Variants of interior of column station
The Institute offers:

- geodetic engineering and geological research of construction sites;
- inspection of buildings, structures and networks;
- holding approvals from government agencies and services;
- technical assistance and advice on the design;
- the development of environmental measures.

The number of employees of the institute are attracted designers with years of experience who have been involved in the development of structures in Moscow, Leningrad, Kharkov, Donetsk metro projects.

With their participation, drafted such a unique and complex objects such as Baikalskiy, Severomuyskiy, Mysovyi tunnels of BAM, shaft lifts in Crimea, wine storage tunnels in Yalta, Gurzuf, Alushta, Abrau-Durso. The Institute’s experts advised the Czech, Bulgaria, Algeria, Kazakhstan, Latvia engineers in the design of tunnels in their countries.

Construction of new double-track tunnel between Beskyd - Skotarsk, Ukraine
Construction of highway Sochi
“Doubler of resort prospect”
from 172 km of federal road
Dzhubga - Sochi to Start of district
of Sochi with reconstruction
to Zemlyanichnaya street

- Night illumination of portal
- Designing portals and
  system of supporting walls
Underground parking in residential areas of Kiev
Underground pedestrian crossing on Vozduhoflotskly avenue
Complex of underground structures of wanted station

Variant of interior of wanted station
DESIGN PROJECTS

Transport Interchanges in Krasnodar, Russia
Construction of highway "Doubler of resort prospect" from 172 km of federal highway M - 27 to start of district of Sochi
Road tunnel in Sevastopol