BAUER Maschinen GmbH is the leading company in developing and manufacturing of specialized foundation equipment. Based on their experience, BAUER Mining Solutions is actively involved in major mining and exploration projects world wide since many years.

BAUER Mining Solutions offers equipment and systems in the following fields:
- Onshore exploration
- Offshore exploration
- Bulk Sampling
- Groundwater control
- Cut-off systems
- Mine development
- Mining systems

In addition to our standard equipment, we are designing new, custom made solutions together with our clients for special challenges, based on our proven components.

**Rotary drilling rig BG 36** drills holes with a diameter of 2.5 m to a depth of 60 m in kimberlite pipes (Australia)
Mineral Exploration is the process to identify ore bodies in the earth's crust and to determine the distribution of minerals and its commercially viable concentration.

Exploration activity is conducted in brownfield areas (an area where there is current or past mining of a particular resource) as well as in greenfield areas (an area where there are no current mining operations or known mineral resources).

Methods for exploration can be divided into:
- Drilling core samples that intersect a mineral deposit
- Bulk Sampling
- Sea floor exploration

Our daughter company PRAKLA Bohrtechnik provides drilling rigs for drilling diameters of up to 1000 mm. RB rigs are mainly used for sampling and coring to a depth of 500 m and more. To accurately investigate rock sequences – for which the recovery of drill cores is necessary – rotary wireline core drilling with a double tube core barrel is applied. The most common borehole diameter is 146 mm with a core diameter of 101 mm. To perform core drilling with these dimensions rotary power swivels are needed that can achieve speeds of up to 240 rpm.
"Bulk sampling" is a commonly used industry term to describe the practice of the removal of relatively large quantities of a mineral bearing substance for the purpose of testing mineral content. Bulk sampling locations are selected at random with the necessity of using mobile but powerful equipment which is capable of fast and easy self-travelling between sampling locations and extracting up to several hundred tons of ore at one sampling position. Equipment, which originates from the foundation business, are excellent tools for this purpose.

Typical examples of equipment which is normally used for constructing bored piles or diaphragm walls are:
- Rotary drilling rigs with kellybar system. (intermittent dry or slurry supported process)
- Rotary drilling rigs with RCD attachment (continuous reverse circulation drilling)
- Hydraulically operated and wire-rope suspended grabs (intermittent dry or slurry supported process)

Bauer rotary drilling rigs BG and hydraulic grabs DHG

They are excellent tools for the exploration industry. The capacity of forming holes with diameters up to 3 m and depth to 100 m even in very hard ground conditions makes them ideal for bulk sampling. The holes can either be cased or for greater depths stabilized by drilling mud.

BG 48 kelly rig, drilling in the Megalodon alluvial deposit in Kleinzee area, South Africa borehole diameter 2.5 m and max. depth 140 m.
GB 50 base carrier with a hydraulically operated grab, drilling pocket beaches along the Atlantic Ocean in Namibia.

Bulk sampling of mine dumps is an ideal application for the BG 36 kelly drilling rig, 2.5 m diameter sample holes in Kimberley, South Africa.

Reverse circulation drilling rigs

Rotary drilling rig BG 36 RC for the sampling of deep kimberlites in Saskatoon, Canada with diameter of 1200 mm to a depth of 360 m. Installation of long top casing with oscillator to 40 m and kelly bar drilling to 100 m. Thereafter drilling system is changed over to RC drilling. The unit is derived from the standard Bauer BG series.
Sea floor bulk sampling

Bauer Maschinen offers sea floor bulk sampling for diamonds with trench cutter technology. Over 4000 samples were extracted from the seabed to a depth of 5 m and 200 m below sea water level off the coast of Namibia by a sampling tool designed for BHPB.

MeBo

MeBo is a seafloor core drilling rig, working in water depth up to 4000 m. It is deployed on the seabed, is electrically powered and remotely controlled from the vessel via umbilical (survey by cameras and sensors). Four foldable legs provide for safe landing and verticality on the seafloor.

The MeBo stores drilling rods, casing tubes and rotary barrels on two rotating magazines. Depending on the drilling system and coring diameter, the MeBo has a capacity to drill up to 200 m into the seafloor, to recover cores of 74 to 101 mm diameter. Multiple cores can be stored in the rod magazine to the total maximum capacity. The preferred sampling methods are push coring (soft sediments) and rotary drilling (wire line coring) for rock and sediments. Other methods like CPT or vibro coring are optional.

MeBo was originally developed in cooperation with the Marum Centre for Marine Environmental Sciences (University of Bremen).
Bauer Maschinen offers machinery for working steps which are associated with mine development, such as:

- Blast hole drills
- Drill rigs for additional exploration
- Trench cutter technology for mining
- Costumized solutions
- Machinery for the control of ground water.
Mining with trench cutter technology

The well-proven trench cutter technology of Bauer – which is normally used for constructing underground walls – can also be used for special mining activities. A good example is the introduction of the system in a diamond mine in Sierra Leone. There are areas where kimberlite is present in narrow but long and deep veins within granitic base rock. With the trench cutter technology it is possible to excavate the kimberlite dykes without the need of large scale rock excavation.

Kimberlite dyke (Sierra Leone)

Special systems for mining

For its Mclean Lake project, AREVA Resources Canada Ltd. addressed BAUER Maschinen GmbH for the development and manufacture of an alternative mining method for small, pocket-shaped high grade uranium deposits, embedded in sandstone. BAUER Maschinen GmbH designed and manufactured a system to mine the uranium ore: the High Pressure Reverse Circulation (HPRC) system in close cooperation with AREVA Resources Canada Ltd. and BAUER Resources.

Inserted in a pre-drilled and fully cased borehole, the system uses a 3-phase water jet with a pressure feed of up to 600 bars to loosen the ore in the target depth of 150 to 180 m and the reverse circulation technology to feed into a dewatering system. The system is a viable, special and customized solution whenever the mineral deposits are too small to be mined with an open pit or with underground operation.

Sandstone

Uranium “Hotspots”

Canadian shield (granite/gneiss)

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Blast hole rigs

Our daughter company HAUSHERR from Germany is specialist for offering full ranges of blast hole drill rigs in various sizes and versions for drilling diameters from 3 to approx. 9 inch. Machines of the HBM-Series can be used for rotary and / or DTH drilling, whereas machines of HSB series are exclusively for DTH drilling. A wide range of options allow a high grade customizing of the rigs, which are used in blast hole and exploratory drilling in all kinds of open cast mining. Each rig has on-board compressor (high or low pressure), a rod magazine and a safety comfort operator cabin (ROPS / FOPS). All rigs are powered by CATERPILLAR diesel engines with sufficient power reserves. If required some of the models can be installed on a wheeled chassis instead of a crawler or / and with a 90° slew ring. The service free hydraulic rod handling magazine operates without sensor technology. Depending on the machine type, the usable length of the rods vary from 3 to 11 meters. All rigs are distinguished by their excellent accessibility, their long service life and by their simple and robust technology.

Perforation Cutter

In combination with floating clamshell mining e.g. for gravel, the Perforation Cutter supports the clamshell operation in dense or hard layers, where even a hydraulic clamshell cannot penetrate effectively. The BAUER cutter technology is applied to perforate the hard layers to provide access to the jaws of the clamshell, thus allowing excavation of these layers and further production.

Customized solutions

Many problems in mining can be solved when finding new and economic solutions. Based on the world wide experience over many years in designing and constructing of specialized foundation equipment, it is the strategy of Bauer Maschinen to design new customized solutions and machinery for solving problems in a new way. Such an approach will always be made in close cooperation with the customer with incorporating their ideas and wishes.
Cut-off wall

Cut-off wall systems are ideally suited as water barriers around excavation pits, mining pits or similar. A variety of cut-off systems is available for almost each type of soil and site condition, for temporary or for permanent use. Cut-off walls are constructed with techniques of the specialist foundation industry like trench cutters, slurry wall grabs or soil-mixing techniques. Wall material ranges from plastic concrete, standard concrete to in-situ mixed soil-cement material.

Continuous cut-off wall

For sealing off big lignite open pits in Germany, the energy company Vattenfall created a system of a continuous cut-off wall. The soil is excavated with a special cutter – designed and supplied by Bauer Maschinen. The excavated soil, mixed with clay slurry is pumped into the continuous trench behind the cutter. After sedimentation, an impervious clay crust is formed on both sides of the trench.
For many operations slurry is required for stabilizing holes or as transport medium for cuttings.

**Slurry mixers** are essential components when constructing boreholes, wells or cut-off walls. MAT mixers are capable of mixing bentonite slurries, cement slurries or bentonite-cement slurries. They can be provided as fully automatic and electronically controlled units, or as manually operated batch mixers, especially suitable in remote areas.

**Desanding and separation units** are required when working with reverse circulation methods (well drilling, wall construction with BC cutters) to separate soil cuttings out of the slurry backflow. A variety of systems is available depending on the particle size of the cuttings and the volume stream to be cleaned. Bauer BE desanders can treat volume streams from 50 – 1000 m³/h.

Well drilling

A standard method for groundwater control is the installation of wells. Wells are constructed around and inside open pits to allow for dry mining. In combination with cut-off walls deep wells are installed inside the pit for dewatering and to keep the water table below mining level at all time.

Our daughter companies PRAKLA Bohrtechnik as well as BAUER-DEWET provide drill rigs for drilling water wells up to 1000 mm diameter with a hook load capacity of up to 100 tons.

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