

NGR: NATIONAL GEOLOGICAL REPOSITORY

What is a borehole?

So – what's a borehole? – The Oxford English Dictionary defines a bore as:

“A hole made by boring.... in later use chiefly an auger hole, or other cylindrical perforation”

“A deep vertical hole of small diameter bored into the earth to ascertain the nature of the underlying strata or to obtain water”

As far as BGS is concerned it is any hole drilled or dug into the sub-surface for the purpose of extracting or investigating the material at that particular point. Commonly cylindrical the length of the hole will always be several orders of magnitude greater than its width or diameter.

Boreholes include any drilled onshore and offshore, for any purpose and to any depth and include auger holes, shafts, pits, auger holes, shot-holes, wells and vibrocores

There are two main types of bore, open holes and cored holes and there are two main types of drilling rigs, rotary and percussion.

For the purposes of its work BGS also considers probe holes and trial pits as the equivalent of boreholes. This is because they provide similar information.

Several hundred years BC the earliest deep boreholes were bored by the Chinese and reached depths of 200m. BGS hold original borehole records that date back to the early 1700s and records from some of the earliest deep rotary and diamond drilling carried out in the 1860s.



Shell and auger drilling

The main purposes for drilling boreholes:

- Shallow drilling for site investigation and construction e.g. Motorways
- Mineral exploration, including sand and gravel
- Drilling for water and water abstraction
- Oil and gas exploration and extraction
- Monitoring.

Methods of drilling:

- Hand auger or hand digging
- Shell and auger rigs (as seen at the side of motorways) used for site investigation
- Small scale rotary drilling often lorry mounted
- Hammer Air flush drilling for water supply
- Offshore drilling from ships
- Large rigs on large platforms both onshore and offshore.

A borehole record is a written description of the material that comes out of the ground as a result of drilling a bore. Alternatively it may be electronically generated from the properties of the rocks by lowering instruments down the bore.

Boreholes are useful both to BGS and external organisations. They provide site-specific information that can help determine the geology and nature of the ground and can help identify any apparent or potential hazards.

What can boreholes tell us? They can provide specific information about:

- Soil conditions – for construction
- Engineering properties – physical and chemical
- Contamination – natural & man-made
- Geology

- Geothermal potential
- Structure
- Mining activity – deep & shallow
- The presence of natural cavities
- Presence of minerals – coal, oil, sand, gravel gypsum etc.
- Presence of water and monitoring its availability
- Hazards – finding presence or alleviation.

And much much more

What do we keep and collect from boreholes?

Drilling, sampling, testing and extracting information from boreholes and making an accurate record is very expensive. However it is also expensive to keep and store this information.

We will keep all site investigation reports in their entirety and any individual borehole or geophysical record. We also keep other relevant information such as photographs and video recordings. We will accept and keep either digital or paper versions, although digital versions are now preferred, where possible

Typical borehole record

We store selected core and sample material in the National Geological Repository. What we keep is determined by our requirements and input from external advisors and also by cost!

Why do we keep it?

Boreholes provide one of the most important sources of information available on the geology and structure of the sub surface. The most common, shallow boreholes, are drilled for construction work and provide a large amount of the information upon which we base our interpretation of the geology and is the basis for our surveying work. We need this information to carry out our national surveying remit.



Examining core material held by the NGR

Borehole records save time and money by allowing companies to design their surveys and construction work properly. Deep boreholes are extremely expensive and exploration companies can use existing information to try to predict the presence of ore bodies and hydrocarbons, for example.

Materials collected from boreholes can be used to corroborate the written record, and for further analysis and testing. If borehole material has been stored properly its properties do not change significantly with time and it can be re-analysed for other purposes. For example core from a borehole drilled in London for water in 1877 was analysed over 100 years later as part of a study of potential source rocks for oil

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