PRACTICA
foundation

Product sheet

Manual well drilling

Stone-hammer and Rota-sludge for harder soils

In addition to the existing methods for manual drilling, Practica has developed a drilling package consisting of the Rota-sludge and Stone-hammer. The Rota-sludge scrapes and hammers lightly, while the Stone-hammer hammers with considerable force. The Rota-sludge is used for soft and semi consolidated soils. the Stone-hammer for harder soils and boulders.
The Rota-sludge is based on the sludge or hand percussion method as practised in India but modified to allow drilling through semi consolidated materials such as sandstone or lava.

Rota sludge drilling

How it works

Rota- sludge

The equipment consists of a column of 2 inch pipes, screwed together, with a cutter on the bottom end. This pipe column is lifted by a lever and dropped down sharply to hit the bottom of the well. A handle is attached to the pipe and at the moment of impact the pipe is turned about 45 degrees.
The cutter at the bottom is provided with teeth, which scrape away soil. So there is a hammering and scraping action.
When the pipe column is lifted, the driller closes off the top of the pipe and opens it at the beginning of the down-stroke. Because the well is kept full of water, this closing and opening at the right moment, causes the water to be pumped up through the drilling pipe. The water flow carries the cuttings with it.
To seal off the walls of the well, to prevent caving–in and facilitate the transport of cuttings, cow-dung is added to the water. This makes a sludge, hence the name Rota-sludge.

Stone-hammer drilling

Stone-hammer

When boulders or hard clay are encountered, the Stone-hammer can be used. The hammer is a closed piece of pipe with an open-ended drill bit at the bottom. In the pipe a weight (hammer) is activated with a rope from the surface. Lifting and dropping the hammer drives the drill bit down. When 60cm has been drilled, the unit is pulled up to the surface to empty the hollow drill bit

Economics

The investment cost for a complete set of Rota-sludge or Stone-hammer equipment is in the order of $800 in Africa and Latin America and about $100 in India.
Machine drilled wells often cost $100-300 per meter (West Africa), dug wells around $50/m (Nicaragua) and manually drilled wells cost in the order of $25/m (Nicaragua).
In most cases manual drilling competes with dug wells rather than with machine drilled wells.

Rota-sludge drill bit

Applicability

Experience gathered so far, shows that the Rota-sludge and Stone-hammer methods come in where the soil is too hard for jetting or augers.
Most developing countries have regions where these methods can work and are cheaper than other options.
At present the PRACTICA manual drilling techniques have been introduced in India, Tanzania, Nicaragua, Ghana, Ethiopia, Senegal and Niger. In Chad it will be introduced in 2005.

Stone-hammer drill bit

Introduction

To find out if and to what extent these methods of manual drilling are of interest for a country or region, PRACTICA usually carries out a feasibility mission.
This mission comprises a study of the geology to have a first indication where it may be feasible, followed by fieldwork where the geological data are checked against the information in the field from existing wells, well diggers and visual information. To complete the mission, in the areas where chances of success are highest, some test wells are drilled. The duration of an identification mission is generally around six weeks.
Based on the information gathered in this process,
A decision can be made on how to proceed.
If it is decided to proceed, PRACTICA can provide training and technical assistance.
Manuals are available, both for the manufacture of the equipment and the drilling.