

Baptist Drilling

Paul Cloesen (paulcloesen@yahoo.com), May 2007

A hybrid between sludging and percussion drilling, this method permits to drill through loose soil and “soft” rock, like light conglomerates, consolidated volcanic ashes, some calcareous rocks and weathered materials. It will not, however, penetrate hard original rock or boulders (e.g. in ancient river beds).

Like in sludging, the drilling process is continuous : the drill bit is normally not removed from the borehole until it is finished and the broken material is pumped to the surface in the drilling liquid (mud). But instead of using a hand as a valve on top of the drill pipe, the drill bit itself doubles as a foot-valve. The driller’s hand does not have to reach the end of the drill pipe and drill stem extensions can be several meters long.

Percussion action is performed by lifting the drill stem with a rope over a pulley, attached to a simple derrick, made with whatever available wood or bamboo poles.

The hole diameter is kept as small as possible. Drill bits are based on a 1 ¼” (32 mm) internal diameter iron plumbing accessories and the well is cased with a cheap 1 1/2” (39 mm) PVC pipe. Such casing can accommodate a 1 ¼” PVC piston pump. But if required, the upper part of the well (until slightly below the lowest expected water table) can be reamed to larger diameters, to accommodate larger pumps.

The main drill tool consists of a 3 m length of 1 ¼” (32 mm) iron or galvanized pipe with a bit/valve (see drawing). For extension of the drill stem, ordinary plumbing PVC pipes (SDR 26) with glued-on thread adapters have been used successfully in holes up to 30 m deep. Over 100 m depth has been reached using heavier PVC pipes (schedule 40 or 80). The use of PVC drill stem significantly reduces the cost of the equipment and keeps total weight of the tool low, even in deep holes. Therefore, no lever is needed to lift it and stroke-length can exceed a metre if so required. On the other hand, PVC stem limits the use of rotary action, especially at greater depths.

No temporary casing is used. The borehole being kept full of mud and the “caking” of mud into any unstable sand layers, as a consequence of the percussion action and friction of the smooth lateral edges of the bit, is normally sufficient to stabilize it. Drilling mud is evacuated from the borehole after casing the well by pouring or injecting water into the casing (backwashing).

This technique adapts best to sand, loam and light rock. The standard drill bits also work through sticky and even consolidated clays. Nevertheless, best results in varying conditions are obtained with an array of different bits, including open-ended (hollow) bits without a valve. In layers of pure clay or gravel, progress may slow down compared to sludging, since the clay has to be pounded into suspension and stones have to be ground to small pieces in order to pass through the footvalve.

A Baptist drilling rig, fit to drill holes up to 30 m deep, can be built in Nicaragua for about US\$ 150. This includes all essential non-common tools to operate it. The core element, its drill bits, can be made in about any arc-welding workshop, using only materials that can be found in virtually any hardware store.

