

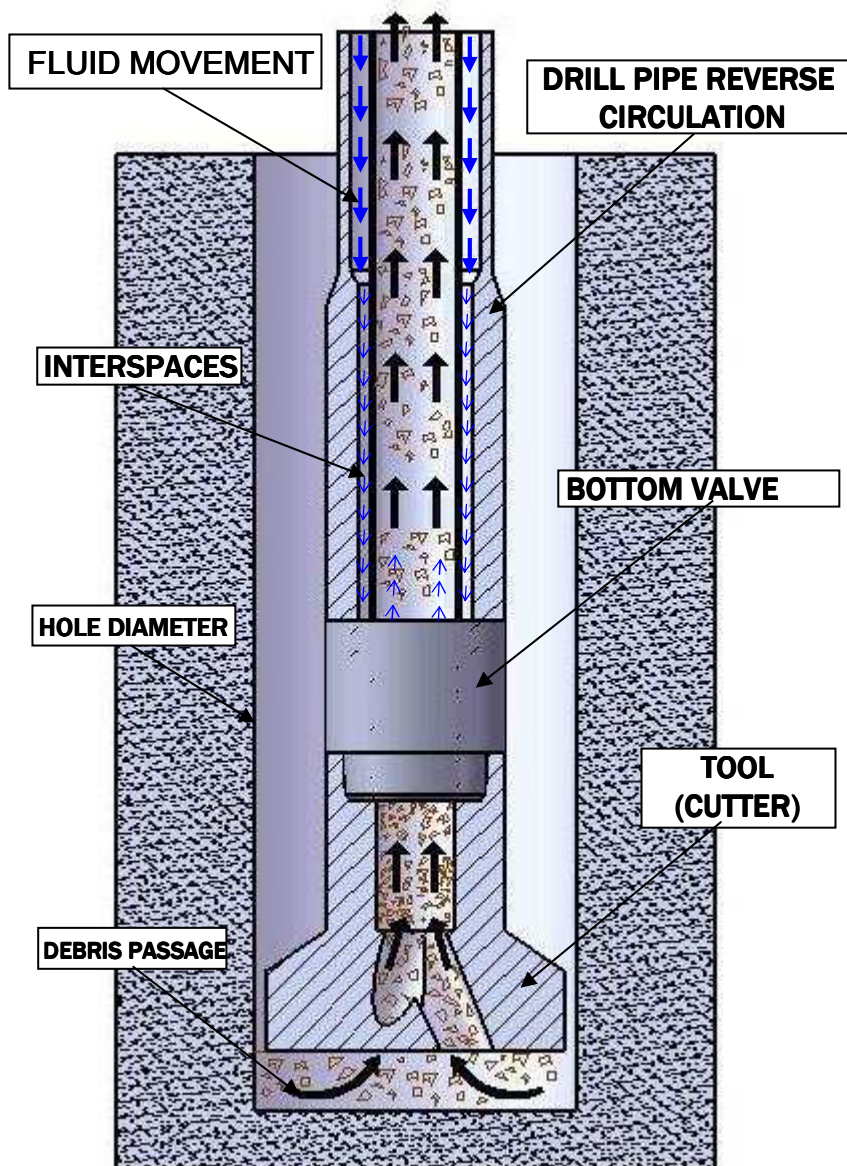
REVERSE CIRCULATION:

PRINCIPLES OF OPERATION AND EQUIPMENT

In the case of use of drill pipes of "double-wall" for the reverse circulation drilling, the fluid movement is introduced under pressure in the annular area created into the cavity between outer tube and inner tube and arrives in the depths to feed the drilling tool, thus enabling the removal of debris from the bottom of the hole; these go back along the inner pipe at a speed that can reach 1000 m / min and it is independent of the relationship between the outer diameter of the pipes and the diameter of hole drilling.

There are available equipment for the perforation by Reverse Circulation according to 2 working methods:

- 1) use a cutter with trice
- 2) use the bottom hole with hammer and cutter

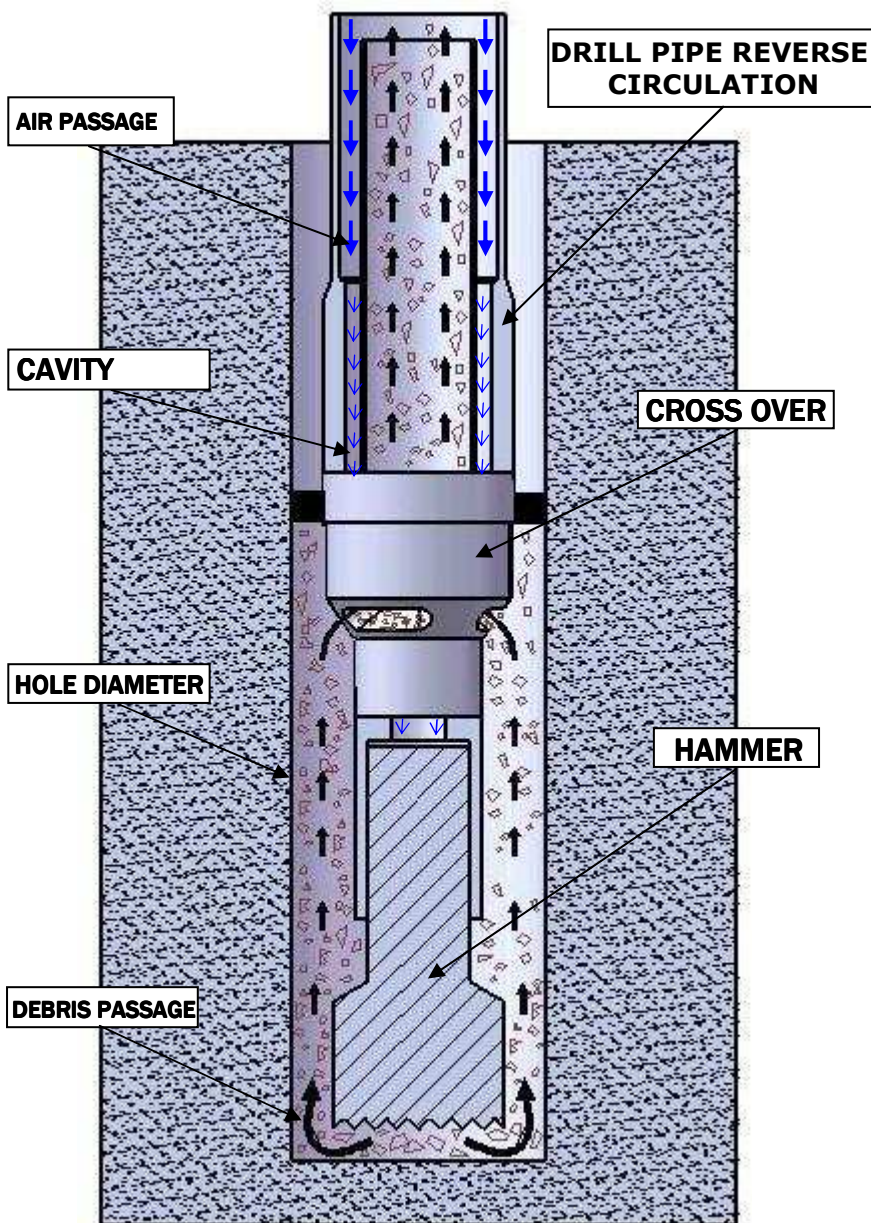


In case 1) (see fig. 1), the diameter of the cutter is at most a "nominal size" larger than pipes, thus the space between the outer pipe and the hole is reduced and the column of pipes partially or fully supports the walls of the hole acting as a "stabilizer"; the fluid, consisting of a mixture of water and mud containing polymers, travels through the cavity between the pipes and reaches, in depth, to a "bottom valve", interposed between the last pipe and the cutter where generates a reversal of the airflow that draws suction debris excavated from the cutter. In some cases it may be more appropriate and convenient to start with the direct drilling pipe and cutter and then proceed to plug the battery of reverse circulation after valve interposed which allows the passage of debris sucked into the deep cutter

Fig. 1 USE WITH CUTTER TO TRICON

The fluid movement may be dry air, air and water, air and water with addition of polymers or surfactants. The air flows to feed the drilling and removing the debris is significantly reduced compared to traditional methods; The consumption, in fact, may be from 4 to 6 times less than the "direct circulation"; in other words you can obtain drilling of superior using higher energies of reduced compression and thus reduced compression and therefore more economic.

Extremely important that the drilling is almost not affected by turbulence in the area above the pipes (bottom zone valve or cross over) ensuring stability and grip on the walls of the hole and increasing the useful life of the pipes that do not encouraged by the continue erosion on the external surfaces



In case 2) (see fig. 2), the column of air forced through the annular space between the pipes provides the power needed to operate the hammer; the debris produced pushed from the exhaust leak from the hammer go back the cavity between the walls of the cylinder bore and the hammer and pass through a special "cross over" interposed between the column of pipes and the hammer, merged into an upward flow of air created in the inner of pipe column .

Fig. 2
USE WITH BIT AND HAMMER