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Technology of Underground Oil and Gas Production

Ukraine is rich in oil and gas deposits. Oil is a natural fuel, oily liquid that is a mixture of hydrocarbons of diverse structure. Oil and gas accumulate in porous sedimentary rocks – sand and sandstone. The depth of these deposits is mainly over 1000 meters. The most favorable conditions for the formation of oil and gas fields occur in cases where the sandstone is bent into the crease facing arch upward. The upper part of the dome is filled with gas, while oil is below gas, and water below oil.

The method of the wells began to be applied in the 17th century for the production of salt dissolve, later this method was used for the extraction of artesian water, and from the mid-19th century for the production of oil and gas.

By the nature of the impact on the rocks the following drilling methods are distinguished: mechanical, thermal, and physico-chemical.

Drilling is the main operation in oil and gas. Unlike coal or iron ore oil and gas are not to be separated from the surrounding array of machines, or explosives, there is no need to raise to the surface by conveyor or in car. Once the well reaches the reservoir, oil or compressed gas forces itself upward.

As oil poured on the surface, the pressure decreases, and the rest of oil stops flowing upward. Then water is pumped through specially drilled field wells around the oil. The water pressures oil and pushes it to the surface on the newly revived well. And then there comes time when only water can help no longer. Then pump is immersed in an oil well and it starts sucking oil up.

Mechanical drilling method is used to drill deep wells. Depending on the type of mechanism that drives the bit, the following drilling methods are distinguished: rotary, turbine and electric drilling methods.

In rotary drilling, the torque is transmitted from the engine through the rotor becoming pipes and bit. But rotary drilling has its drawback. The deeper the hole, the harder the engine is running the rotor, the slower drilling. It is one thing to rotate the pipe of 5-10 m when drilling a well is just at the beginning, and quite another is to twist the pipe string with the length of 500 m.

When the turbine is rotating drill bit hydraulic turbine is installed directly above the bit. At electric drill bit rotates the motor.

A group of oil and gas fields and mineral deposits like coal, gas and oil forms basins. They are usually confined to flex the crust in which sediments are deposited.

Thus modern technology of underground oil and gas production allows for various possible methods of recovering oil and gas under different conditions.