# Underground Mining of Coal Seams of Gorj Basin, Situated in the Difficult Hydro-geological Conditions

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## ABSTRACT

The coal seams of the Gorj basin involve 80% of the Romanian lignite reserves and ensure over three quarters of coal based energy production. Until now, the coal reserves in the normal geo-mining conditions are nearly completely mined and, consequently, must be mined, in the future, the coal deposits situated in difficult hydro-geological conditions. The hydro-geological researches made in the Gorj coal basin have highlighted five aquifer levels in the Dacian - Levantin carboniferous complex, with different flows, ranging between 0.38 and 96 $m^3$/hour. So as to ensure the favourable and safety work conditions in the coal faces, the dewatering workings are very important. In view to mining the coal seams situated nearby the aquifer geological structures, a set of workings are necessary, such as: aquifers dewatering, drainage systems, rivers regularization and arrangement, etc. Also, in these conditions, the mining methods parameters must be optimised for minimizing the coal production costs.

Keywords: mining, underground, coal, seam, drainage, aquifer

## HYDRO-GEOLOGICAL CONDITIONS OF THE DEPOSIT

The hydro-geological research workings done in the Gorj basin has shown that within the Dacian-Levantin coal complex, sandy levels, with variable thicknesses, are developing, because of the lateral facies crossings and variable grain size, from fine clayish ones to coarse sands.

he ascending deep aquifer seams are situated under the erosion base and are fuelled by the exposed area of the regions hydrographical network. Compared to the free level aquifer seams, the fuelling of ascending aquifer seams is permanent, and determines for that certain perimeter the basic hydro-static level. The category of deep aquifer seams with a free level includes those concentrated in the roof of coal layer no. VIII.

ditions is 2.4$m^3$/h.

*b) The aquifer horizon situated between coal seams no.X-VIII*

This lithologic interval develops more sand banks with a lens-shape layer character and with a grain size that is mostly fine up to clayish fine. The thickness of these lenses varies

These horizons concentrate aquifer seams that can be with a free level, when the permeable rock situated between non-permeable rock is not fully saturated. Free level aquifer seams are generally situated above the erosion base and are fuelled by rain or from the regions hydrographical network.

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The category of ascending seams includes the layers situated between the coal layers no. IV-V, V-VI and VII-VIII.

*a) The aquifer horizon from the roof of coal seam no. X*

The roof of layer no.X contains a free level horizon that extends almost continuously. Its thickness varies depending on the mining field's morphology, ranging from 2m (in the exposed areas) to 40m. The medium flow in exhaustion con

between 2m and 25m. The grain size and lens-shape character of sand seams determines a low flow potential.

*c) The aquifer horizon situated between coal seam no. VIII-VII*

The aquifer horizon has a lens-shape development and an irregular grain size, varying from fine to fine-clayish sands, to