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UNDERGROUND COAL GASIFICATION

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Originated in XIX century idea of underground coal gasification, oriented towards the possibility of producing gas directly from the coal, without extracting it and processing on the surface, is still attractive for many research and development centers, especially taking into consideration resources that cannot be made available to the exploitation with traditional mining methods.

Describing it simply, it is similar to coal gasification in a stationary bed, in a natural reactor made of a rock mass, with purposely drilled holes to introduce gasifying agent and to withdraw gas.

In the gasifying area there are following zones: drying; water evaporation out of the seam; outgassing; gasification; burning.

The basic difficulty with underground coal gasification consists in a technical solution of the intended process course, especially with regard to the direction, as well as the disposition of individual zones. As a final result it consists in obtaining, for a prolonged time, gas with constant composition and calorific value.

Underground coal gasification may be executed in two ways:

- shaft method, and
- shaftless method – so called “borehole method”.

In the shaft method coal seam is made available either through the shaft or other heading. The seam is cut into parts with mining methods and parts thus obtained are prepared for the gasification.

The shaftless method consists in drilling from the surface a net of holes into the coal seam. From the technical point of view this method is much more difficult but it completely eliminates need of the human underground work. In this method fire and filtration technology is mostly used. The seam is ignited and the compressed air is forced into it. The combustion zone propagates until reaching the neighbor production well. Sometimes separate production wells are used to bring the products gas to surface.

Gas received from the process of underground coal gasification is refined product, and it is easy to remove from this gas all kinds of impurities. It can be used in the synthesis of chemicals, liquid engine fuels, or as a substitution of natural gas (methane).

Underground coal gasification could possibly be a far-reaching method of earning chemical energy from the worst types of coal, i.e. of high ash content and not suited to coking process, especially now, with more and more stringent pro-ecological requirements.