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STUDY OF WATER RESISTANCE OF COAL BRIQUETTES

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ABSTRACT

In the work, the study of the water resistance of coal briquettes obtained the optimal content of the binder. It has been established that the product has high quality characteristics.

INTRODUCTION

We know that in addition to chlorine, activated carbon retains pesticides, petroleum products and some heavy metals. After such filtration, the organoleptic properties of water improve: it is deprived of all foreign odors, tastes, turbidity and color, that is, it becomes transparent and pleasant to the taste. The invention relates to fuel briquettes. A composition is proposed for the production of a water-resistant fuel briquette, containing fine-grained carbon-containing material of mineral origin, molasses as a binder and filtration sludge of beet sugar production, characterized by the fact that it additionally contains cubic residues of distillation of natural fatty acids at the following ratio of components, wt.%: molasses 2.9-3.8, filtration sludge 0.43-0.95, cubic residues distillation of natural fatty acids 1.6–2.7, fine-grained carbon-containing material of mineral origin – the rest. The technical result is the production of fuel briquettes with high values of technical characteristics, which do not lose strength during long-term storage and transportation due to an increase in the water resistance of the briquette to 0.05-0.07, as well as a reduction in electricity consumption due to a reduction in mixing time by at least 2.5 times. Fuel briquettes from the declared composition do not soak in water under the influence of moisture, and do not absorb water vapor from the air, which is achieved through the introduction of a hydrophobic additive, which uses cubic residues of distillation of natural higher fatty acids. The composition of the cube residues contains higher fatty acids with C12 - C20 and higher. Hydrophilic groups (-COOH and -COO Na) of higher fatty acids react with calcium oxide and calcium carbonate, contained in the filtration sludge, forming thin layers of water-insoluble calcium salts with hydrophobic properties on the surface of the particles. Such formations prevent moisture from penetrating to the particles of the fuel briquette. absorb water vapor from the air. These compounds are also not susceptible to degradation when exposed to ultraviolet rays and temperature changes.

The strength of briquettes is due to the formation of bonds from calcium saccharate during the interaction of molasses with calcium oxide of the filtration sludge. One of the properties of cube residues is to increase the intensity of interaction of organic binders (in this case, molasses) with substances of mineral origin: in the proposed composition - carbon-containing components of the fuel briquette charge: anthracite rod, coke breeze, coal sludge. This increases the number of neoplasms responsible for the strength of the fuel composition. As a result, a stable bond is formed in the adsorbent-adhesive system. Additional hardening of briquettes is also achieved due to the formation of insoluble calcium compounds during the interaction of cubic residues with carbonates and oxides of filtration sludge.

Activated carbon as a sorbent for water purification is a reliable, time-tested filter material used in medicine, pharmacology, and industry for purification of liquids and gases. The characteristics of activated carbon currently make it indispensable in the process of water purification from complex impurities.

The reserves of natural gas and oil in the Republic of Uzbekistan are limited, and the reserves of coal meet the needs of the republic for several hundred years.

Uzbekistan's coal industry has a 70-year history. The basis of the resource base of the coal industry of the republic is the lignite "Angrenskoye" and two smaller coal deposits - "Shargunskoye" and "Baysunskoye". It is worth noting that **86% of the coal mined in Uzbekistan falls on the Angren open-pit mine**.

Lignite is a fossil fuel that is formed from lignite or peat [1].

Lignite is different fromCoalIn appearance, it is always brown. It has a lower carbon content, and the content of bituminous volatiles andwater more. That's why lignite burns more easily, Gives MoreSmoke,Smell, as well as when reacting withcaustic potassiumand generates little heat. It contains a lot of water, so it is used in powder for combustion.

At present, one of the main ways of processing coal waste (screenings, spills, sludge, etc.) is their briquetting. The annual increase in the reserves of such waste reaches tens of percent of the total volume of coal mined. In terms of their quality characteristics, they are not inferior to mined coals and can be used to obtain high-quality fuel. Of particular interest is the processing and utilization of carbon-containing materials of man-made origin. An effective solution to this problem makes it possible to take into account the issues of environmental pollution and resource conservation [2; pp.389-395].

The object of the study was the brown corners of the Angren coal mine of the Republic of Uzbekistan. Coals belong to brown coals of grade B with weak mechanical strength, prone to spontaneous combustion, brown-black color, matte, strongly smeared, low density. The strength coefficient of coal packs (according to the scale of Prof. M.M. Protodiakonov) is on average equal to one. For the production of coal briquettes, coal fines with a fraction of 0.01-10 mm are used.

The coals of the Angren deposit are fire-hazardous, according to spontaneous combustion, and are assigned to the 1st group of endogenous fire hazard. The characteristics of Angren coal are given in Table 1.

Table 1 Characteristics of Coal

Indicator name	Designation	Magnitude
Coal grade with indication of size class, mm	2BR	up to 300.00
Highest calorific value, dry ash-free state, (MJ/kg)	Qsdaf	28,54
Lowest calorific value, operating state, (MJ/kg)	Qid	16,24
Ash, dry, medium/limit, %	To	8,40-12,00
Mass fraction of total moisture in operating condition, %	Wtr	32,70
Volatile matter yield, dry ash-free state, %	Vdaf	48,00
Sulphur content, dry state, %	Std	0,40
Carbon content, dry, ash-free, %	Cdaf	73,44
Mass fraction of chlorine, %	Cld	0,08
Mass fraction of arsenic, %	Asd	0,004
Chunk size, %	mm	0,00- 300,00
Mass fraction of trifles, no more than	%	15
Mass fraction of mineral impurities, not more than	%	2

Waste from fat-and-oil production (gossypol resin) was used as a binder.

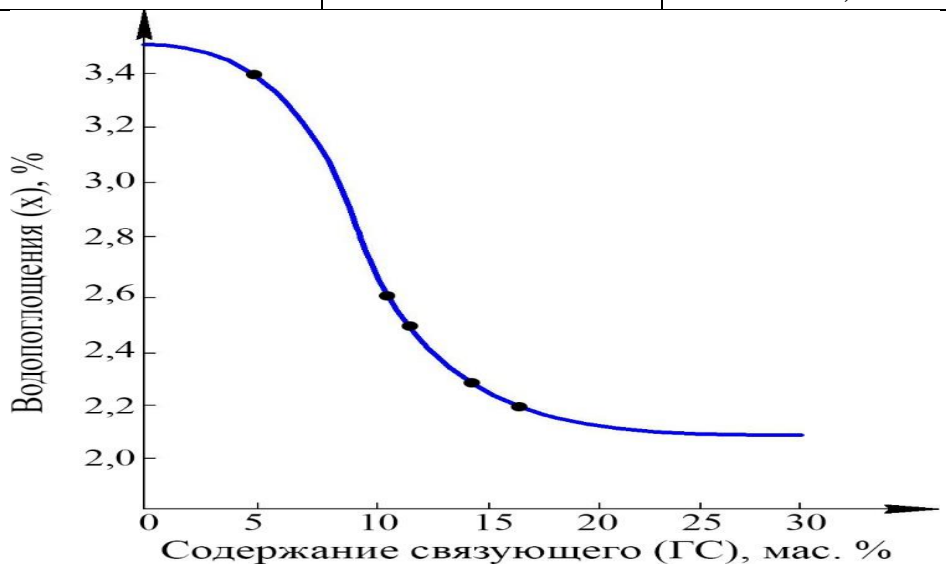
One of the most important problems is the search for new, more cost-effective and high-quality binders.

The technology of manufacturing coal briquettes includes the following stages: delivery of raw materials to the industrial site; storage of raw materials; dosing of raw materials for the preparation of charge mixture; preparation of the raw material mixture in compulsory mixers; transportation of the charge mixture to the molding station; briquette molding on roller presses; transportation of molded products to drying in an open area; drying and strengthening; packaging of finished products (if necessary); Transportation of finished products to the warehouse (or loading into a vehicle).

With an increase in the binder content, the resistance of briquettes to soaking increases. We have investigated tests of coal briquettes for water absorption (X) according to GOST 21290-75 "Coal briquettes. Method for Determining Water Absorption". At the same time, the binder content varied from 5 to 16 %. The filler content is constant – 11% (Table 3) (figure).

Table 3 Dependence of moisture absorption of coal briquette on the content of binder (HS)

Binder Content (HS)	Coal content, %	Water absorption (X),%
5	79	3,4
10	74	2,6
12	72	2,5
14	70	2,2
16	68	2,2



Rice. Dependence of moisture absorption of coal briquette on the content of binder (HS)

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