

## Use of Waste in the National Economy

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**Abstract:** At present, the problem of searching for alternative energy sources and promising ways of resource saving is urgent and is becoming one of the main ones for the development economy of states. In this regard, it is important to research and develop technologies that ensure the integrated use of raw materials and environmental safety of production [1]. Waste from the coal industry, the fat-and-oil industry, and the processing of agricultural products can be turned into high-quality fuel raw materials. In this regard, research and development are under way in many countries, resulting in new types of fuels

**Keywords:** Waste, energy sources, raw materials

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Coal, as an energy carrier, plays an increasingly important role in the global energy system. There are objective grounds for explaining this. Considering the role of coal in the fuel and energy balances of regions, countries and the world as a whole, as well as its dynamics and prospects, it is necessary to take into account the current level of world industrial reserves of various types of fuel.

Uzbekistan's coal industry has a 72-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 85% of the coal mined in Uzbekistan falls on the Angren open-pit mine.

In Central Asia, the Angren coal basin is considered the largest. The coal mined here is delivered throughout the country. The activities of the joint-stock company are carried out on the territory of the Angren coal basin. There are open coal basins "Angren", "Apartak" and a coal mine. The main production site is the Angren coal basin.

At present, many specialists in Uzbekistan, Russia and abroad are dealing with the problem of utilization of finely dispersed coal fines. Vast experience has been accumulated in the preparation and use of fine coal waste. Dozens, varying degrees of efficiency, methods of their processing have been developed [2,3].

During the extraction, enrichment and transportation of fossil coals in the Angren deposit, a significant number of fine classes are formed, which, according to the most approximate estimates, reaches 6-8%. Part of the finely dispersed coals is blown out and spilled out of the wagons during transportation, lost and intensively crushed during loading and unloading operations. Reduction of sludge and fines losses through direct incineration is difficult due to the difficulty of transporting them to the point of use. At the same time, coal fines can be used to obtain high-quality briquette fuel, but its processing is difficult due to the complexity of organizing briquette production and the need to perform a large amount of construction and installation work.

Therefore, the purpose of this study is to briquet coal industry fines with production waste.

The briquetting process occurs as a result of the adhesion of particles to a binder. This process consists of three stages:

- adsorption of the binder by the material to be briquetted and the formation of a thin film of binder on the surface of the particles;
- batch pressing;
- Hardening of the briquette during cooling.

Coal fines, stems of annual plants, and waste from the fat-and-oil industry were used as the studied pressing material.

One of the main performance characteristics of coal briquettes is the mass fraction of total moisture.

The mass fraction of total moisture in briquettes is determined according to GOST 11305, ash content - according to GOST 11306, mechanical strength - according to GOST 18132.

The content of partially destroyed briquettes is determined according to GOST 11130.

The content of partially destroyed briquettes,  $M_p$ , %, is determined by the formula:

$$M_p = m_p \cdot 100 / m$$

where,  $m_p$  is the mass of the over-lattice product, kg;

$m$  is the mass of the total sample, kg.

Sampling and preparation – according to GOST 10742.

The calorific value of briquettes is determined according to GOST 147.

The calorific value is the most important indicator of the quality of energy fuel and characterizes the heat value of coals. In addition, the calorific value is one of the classification parameters of coals, which are divided into types according to the value of the highest calorific value to the wet ash-free state.

The mass fraction of fines in the briquette is determined according to GOST 1916-75.

Ash content was determined according to GOST 11022-95.

The table shows the test results of the developed coal briquettes.

Thus, the expediency of briquetting coal fines is due to its finely dispersed state and the complexity of transportation, the impossibility of burning in standard grate furnaces.

**Table**  
**Test Results of Brown Coal Briquettes**

Indicator name	By ND	Fact
Mass fraction of total moisture in briquettes, not more than, %	20,0	10,0
Ash content of briquettes, no more, %	45,0	25,4
Lowest calorific value of briquettes, average, kcal/kg	2700	3834
Mass fraction of pieces with a size less than the lower limit (fines content), not more than, %	10,0	8,0
Mechanical strength, %	46,1-76,0	58,2
Height, mm	50-150	100
Diameter, mm	50-120	60

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