



Prospects for the Use of Coal Ash in the Development of Innovative and Energy Saving Construction Structures

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Abstract: This article provides information on the production of energy-efficient building structures using a mixture of coal ash and their advantages.

Keywords: Coal ash, the use of coal ash, bricks made from a mixture of coal ash, energy saving.

The main part. It is famous for its proven stability for various applications such as additives used in cement, concrete, mortar, (brick. Blocks) and others. coal ash is an industrial by-product and produces millions of tons per year. coal ash not only environmentally friendly but also cost effective. Its use as a building material helps to increase the energy efficiency of buildings.

Using coal ash bricks, wall panels, flooring, between walls and in the attic, insulation layer on the roof of attic buildings, etc. energy efficient is used very efficiently and economically as a building structure. It follows that from coal ash will soon be widely used as a resource material. By using modern technology coal ash moved from the “waste” category to the “resource material” category.

The use of coal as a fuel in industrial plants (brick, metal and other building materials plants) produces large amounts of ash.

In recent years, the number of enterprises producing construction materials in our country is growing due to the share of the private sector. A number of decisions is being made to gradually shift coal and cement plants to the use of coal as a fuel. They, in turn, are the main source of waste in the form of coal ash in the country. This can cause serious environmental problems.

33% of bricks produced in Uzbekistan are produced at enterprises using coal instead of natural gas.

Currently, the high content of coal used in industry is found to be between 35% and 55%. The amount of coal ash depends on the quality of the coal used and the operating conditions of the plant.

Coal ash can be used as a main component for various building materials. It has great potential for use as an alternative material in the production of energy-efficient building materials. The following can be said as some potential areas of construction where coal ash can be used efficiently and economically.

The advantages in the manufacture of such structures include good quality control, reduction of waste, reduction of labor and control.



Figure 1. Coal ash.

Depending on the needs of local markets, it is possible to produce a variety of wall blocks and bricks, tiles and cast materials.

Raw materials produced on the basis of a mixture of coal ash and other light wastes can have a global economic effect in increasing the energy efficiency of buildings. These materials are mixed and a bonding agent is added. The mixed raw material is poured into molds, after which the molds are sent to a special oven or the product is dried in the open field. The products can be used as a lightweight material in the construction industry.

This also plays an important role in ensuring that the specific gravity of the building does not exceed. The density of the material is 500 kg / m³ from 1300 kg / m³, it is possible to build low-rise buildings with such block wall structures. This material can also be used in multi-layer wall panels, as curtain walls in multi-storey buildings and in cladding constructions.



Figure 2. A brick sample made on the basis of a mixture of coal ash.

Since the structure is not an aesthetically rich material, it can be treated with surface treatment or coating. Thermal insulation properties and ease of production are the most important cost-effective points of using coal ash.

Based on this mixture It is also possible to produce special tiles. The process is similar to that of the tile industry. Coal ash is mixed with less than 10% plastic clay and several additives are added and the tiles are prepared. Bake at a temperature of 900°C to 1000°C and give the desired shape.

The process of producing clay bricks involves mixing coal ash (60%) with sufficient clay. To dry the bricks, pouring is used under ambient conditions or at a moisture level of about 3 percent. These dried bricks are then baked in traditional brick ovens at a baking temperature of 5 to 7 hours. The main purpose of using this technology is to reduce the consumption of valuable soil in the production of ordinary clay bricks.

The density of coal ash is half the density of clay. This is why bricks produced using coal ash are much lighter and this offers several advantages.



Figure 3. A sample of tiles made on the basis of a mixture of coal ash.

In addition, using lime as a binder, it is possible to produce high-strength and quality bricks from coal ash. Construction bricks in a mixture of coal ash can be used in all types of bricks. Lime bricks are composed of large amounts of coal ash, lime and other additives.

The density of the product is from 700 kg / m³ to 1300 kg / m³. Such constructions can be used in multi-storey buildings for load-bearing walls and partition walls up to three storeys.

The density of coal ash ranges from 640 kg / m³ to 750 kg / m³. Coal ash has good economic potential where it is available as a local raw material.

Conclusion

1. Coal ash becomes an important material for various industrial and construction applications.
2. Helps conserve land and natural soil.
3. Research on the use of coal ash shows that great strides are being made in the construction of energy-efficient buildings.
4. It is also beneficial in terms of cleaning the environment from harmful wastes.

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