

BUILDING MATERIALS BASED ON INDUSTRIAL WASTE OCCUPATION**Quziboev Sh.Sh.***Fergana Polytechnic Institute.**E-mail: quziboyevshoirjon@gmail.com***A.A.Vakhobov***Fergana Polytechnic Institute.**E-mail: vahobovabobakir@gmail.com*

Abstract: This article examines the technological and ecological importance of production of building materials from industrial waste. Creating cheap, durable and environmentally friendly building materials by processing industrial waste (ash, slag, plastic and metal waste) is one of the important directions. The article discusses construction products such as fly ash concrete, slag bricks, and polymer-based materials from plastic waste obtained from industrial waste. Also, issues of improving the quality of materials obtained from industrial waste through innovative technologies such as nanotechnology, biocomposites, and 3D-printing were considered. This process is described as one of the effective methods of saving natural resources, ensuring environmental sustainability and reducing industrial waste.

Key words: industrial waste, construction materials, recycling, environmental sustainability, fly ash concrete, slag brick, waste materials, technological innovations, biocomposite materials, hybrid materials

Building materials obtained on the basis of industrial waste.

With the development of industry, the amount of waste from various factories and factories is also increasing. Proper disposal or recycling of these wastes is important in preserving ecology. In recent years, the production of new building materials based on the processing of this waste has become increasingly relevant. This will not only help solve environmental problems, but also allow you to create inexpensive and durable building materials.

- **Types of industrial waste and their properties.**

Industrial waste can come in a variety of looks. For example, large amounts of waste are generated in the metallurgical industry, energy production, chemistry, and other heavy industries. Their main types are:

Ash and slag are products that are activated in the process of burning coal or other fuel in thermal power plants.

Metal waste – residues that arise in the production of steel or iron in metallurgical plants.

Chemical industry waste-waste generated during the production of plastics, fertilizers and other chemical products.

Wastewater-water used in factories is often contaminated with various chemicals.

It is possible to create a variety of building materials by properly processing this waste.

- **Technologies for processing and creating building materials.** Technologies for processing industrial waste as building materials are developing in different directions. The most commonly used methods are as follows:

- **Production of concrete and brick from ash and slag.** Thermal power plant waste (ash and slag) is used as a key component in the production of concrete or brick. This method not

only helps to dispose of waste, but also allows you to create durable and durable building materials.

- **Polymer-based materials from plastic waste.** Plastic waste can be dissolved and converted into polymer products used in construction. This not only reduces waste, but also creates lightweight and water-resistant materials.
- **Construction structures from metal waste.** Various metal structures or elements can be produced by re-smelting or recycling waste from the metallurgical industry.
- Environmental and economic benefits.
- Building materials that can be obtained on the basis of industrial waste have multifaceted advantages:
- **Environmental efficiency:** waste recycling protects the environment from pollution and reduces the volume of waste landfills. It also helps to preserve natural resources.
- **Cheap production:** waste usually has a low price or even is given for free. This significantly reduces the cost of building material production.
- **Strength and longevity:** many waste products, such as slag and metal residues, have high strength. This ensures that the materials are durable and long-lasting when used in construction.

Future prospects. With the development of Science and technology, new types of building materials are emerging, which are obtained on the basis of industrial waste. Environmental sustainability and waste reduction are global challenges, so this sector requires further investment and research. In the future, materials produced on the basis of industrial waste are expected to be more widely used, which will be instrumental in improving both the construction industry and the environmental situation.

Types of building materials created on the basis of industrial waste. Today, there are a variety of building materials that can be obtained through the processing of industrial waste. The most common of these are the following:

Fly Ash concrete (ash concrete). Fly ash, the ash produced during the activated charcoal burning process, is widely used in the production of concrete. This material increases the strength and durability of concrete. Fly ash concrete is resistant to high pressure and corrosion and has a long service life. It is also used in the construction of large structures and bridges.

Slag brick. In the metallurgical industry, slags formed in the process of iron and steel production are used to produce slurry bricks through special processing. These bricks are known for their robust and insulating properties, providing thermal and sound insulation in construction.

Materials made of plastic waste. Plastic waste is today considered one of the global environmental problems. By dissolving them, through special technologies, plates, polymer panels and other building materials are being prepared as replacements for wood. These materials are distinguished by their resistance to water and air conditions and can be widely used in construction.

Materials based on sewage sludge. The blisters formed from the effluent of factories and factories can be dried and special plates or blocks made from them. These materials are commonly used in agricultural structures and for the interior walls of high-rise buildings.

Innovative technologies and development opportunities. Industrial waste recycling technologies are improving every year. Many scientists are researching the creation of new materials and improving their quality. Some modern innovative technologies are as follows: **Nanotechnology.** Nanotechnology is being used to improve the quality of building materials obtained on the basis of industrial waste. For example, in the processing of ash and slag, nanomaterials can be added to produce more durable and environmentally friendly concrete. 3D-printing technologies.

3D printing technologies make it possible to apply materials from industrial waste in the construction process. The production of building blocks or details made of recycled materials using special printers is considered as a revolutionary solution in the field of future construction.

Oxygen enrichment technology. In the processing of waste in the metallurgical industry, oxygen enrichment technology is used. This means that materials extracted from metal waste can be achieved with greater quality and durability.

Environmental sustainability and importance for future generations. Building materials obtained on the basis of industrial waste contribute significantly to ensuring environmental sustainability. As a result of the increase in the population and the development of industry, the amount of waste is also increasing. By using this waste in the production of building materials, the degree of damage to nature can be reduced.

In addition, this process helps to save natural resources. For example, the soil and energy consumption for the production of bricks is reduced, as well as the volume of use of natural stone materials in the production of concrete is reduced. This is an important step to leave a healthy and sustainable environmental environment for future generations.

Restrictions and problems in the application of building materials produced on the basis of industrial waste. Although the creation of building materials through the processing of industrial waste has many advantages, there are a number of problems and limitations in this process. Solving these problems will help to apply the process on a large scale.

Collection and separation of waste. Before converting industrial waste into building materials, it is necessary to collect them and separate them in accordance with the appropriate process. This process takes a lot of time and work, and also requires technical means. In many cases, industrial waste does not have the same composition, making it difficult to ensure the efficiency of their processing.

Quality control. The quality of building materials produced from industrial waste can usually be variable. For example, it can be difficult to get concrete or brick with the same quality at all times from the same waste. For this reason, it is necessary to strengthen quality control for materials produced from industrial waste. This requires special laboratories and technical testing.

Legislation and standards. In many states, legal norms and standards regarding the use of industrial waste as building materials are still not fully developed. This limits the large-scale use of these materials in construction. The creation of a legislative framework that complies with safety and environmental standards is one of the important issues.

High cost of technology implementation. Industrial waste processing technologies require expensive equipment and plants. Especially in developing countries, a large investment will be needed to implement these technologies. Therefore, making technologies in this area more affordable and attracting more investments is one of the pressing issues.

Scientific research and innovation. The development of scientific research and technology is opening up new directions in the field of converting industrial waste into building materials. Scientists are researching to make these materials more durable, affordable, and environmentally friendly.

Biocomposite materials. In industrial waste processing, biocomposite materials are being developed by adding biological raw materials. These materials combine natural waste with industrial waste to create building products that are environmentally friendly and easy to process.

Hybrid materials. Hybrid materials are products formed from a combination of various industrial waste and natural materials. For example, metallurgical slag can be combined with natural stone to create hybrid concrete. These materials are distinguished by their strength and durability.

Artificial intelligence and automation. Artificial intelligence and automated technologies help optimize the waste recycling process. For example, automatic waste separation and related processing technologies are being developed using AI. This process significantly reduces time and labor.

Promotion and acceptance in society of building materials based on industrial waste. To some extent, resistance may occur to the introduction of new types of building materials and their widespread use in society. People approach the adoption of new technologies with caution, especially in conservative areas such as construction. Therefore, it is necessary to widely promote building materials from industrial waste to society and explain their advantages.

Increase environmental awareness among the population. Among the population, it is necessary to promote the importance of waste processing and the use of environmentally friendly building materials. Through this, a culture of the perception of industrial waste as building materials is formed.

State programs and support. Programs and financial assistance aimed at processing industrial waste should be introduced by the state. It not only stimulates manufacturing enterprises, but also helps to expand the market.

International exchange of experience. The exchange of experience in the field of industrial waste processing among different countries is of great importance. The experience of developed countries helps developing countries to implement effective solutions in this area.

Conclusion.

Building materials obtained on the basis of industrial waste have a huge advantage not only in solving environmental problems, but also economically. These materials are inexpensive, durable and long-lasting, providing new opportunities in the construction industry. The development of industrial waste processing technologies and their large-scale application will remain one of the main factors of sustainable future construction. Building materials obtained through the processing of industrial waste open up great potential, both environmentally and economically. They are an important resource for protecting nature, reducing the amount of waste and lowering the cost of construction. At the same time,

technological progress and scientific research in this area remains the main factor in the creation of new materials and their implementation in practice.

It is expected that in the future, large-scale processing of industrial waste and the creation of environmentally sustainable building materials will be of great importance in large-scale construction projects. It plays an important role not only in protecting the environment, but also in creating new economic opportunities.

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