

Реализацию стратегии инновационного развития в образовательной сфере планируется осуществлять, основываясь на принципе интеграции всех составляющих: образования, науки и рынка. Наряду с решением традиционных задач образования, исследований и консалтинга, университеты в современном информационном обществе должны принять ответственность в обеспечении условий для полноценного развития личности, включая душно-нравственную составляющую.

В целом, можно сделать вывод о том, образование в инновационной экономике остается приоритетной сферой и её роль будет возрастать. Компетентностный подход, который становится приоритетным в образовательном процессе, позволит редуцировать дисбаланс между ограниченными возможностями системы образования и возрастающими потребностями рынка, а запланированные программы развития образования в инновационной сфере будут способствовать формированию нового поколения конкурентоспособных кадров в развивающейся инновационной экономике.

Makarych M. V., Bondar V. V. Ceramic Engineering in Green Building

In a green building the structural creation processes respect the environment and make efficient use of resources. This practice is growing all over the world and complements the conventional concerns of designing buildings that are economical in energy, sustainable and comfortable. A green building is a clean sustainable building that uses little energy and is easy to maintain and available at a reasonable cost. A green building is designed to reduce the overall impact of the built-up environment on human health and the natural environment, through:

- efficient use of energy, water and other resources;
- protecting occupant health and improving employee productivity;
- reducing waste, pollution and harm to the environment [1, p. 21].

The main feature of a sustainable building is using innovative building materials. Ways of achieving sustainability through such building materials focus on durability and the use of minimally processed, plentiful or renewable resources, as well as those are recycled or salvaged.

The development of innovative new building materials has allowed architects to better realise their visions, as they make more daring structures possible due to their improved strength, flexibility and durability. One of these innovative materials is ceramics. Ceramic products like floor, wall and roofing tile, cement, brick, gypsum, sewer pipe, and glass are a major part of modern construction industry.

Ceramic tile is used in applications such as flooring, walls, countertops, and fireplaces. Tile is also a very durable and hygienic construction product that adds beauty to any application. Bathrooms are furnished with sanitary ware (toilets, sinks, and sometimes bathtubs) that are made of a similar material to that of some tile.

Clay brick is used to build homes and commercial buildings because of its strength, durability, and beauty. Brick is the only building product that will not burn, melt, dent, peel, warp, rot, rust or be eaten by termites.

A new study by the Brick Industry Association also shows that homes built with brick offer dramatically more protection from wind-blown debris than homes built with vinyl or fiber-cement siding [2, p. 4]. The study demonstrated that a medium-sized wind-blown object, such as a 7.5-foot long 2 x 4, would penetrate homes built with vinyl or fiber-cement siding at a speed of 25 miles per hour (mph). The test also found that homes made with brick exceed the 34 mph impact resistance requirement for high velocity hurricane zones in the Florida building code. Brick also exceeds Florida's impact resistance requirements for essential facilities in hurricane areas.

The manufacture of ceramic products takes place in different types of kilns, with a wide range of raw materials and in numerous shapes, sizes and colours. The general process of manufacturing ceramic products, however, is rather uniform, besides the fact that for the manufacture of wall and floor tiles, household ceramics, sanitary ware and technical ceramics often a multiple stage firing process is used.

In general, raw materials are mixed and cast, pressed or extruded into shape. Water is regularly used for a thorough mixing and shaping. This water is evaporated into the air during the drying and firing stages. So wastewater is widely used for manufacturing ceramic products all over the world.

Wastewater is any water that has been adversely affected in quality by anthropogenic influence. Wastewater can originate from a combination of domestic, industrial, commercial or agricultural activities, surface

runoff or stormwater, and from sewer inflow or infiltration. Municipal wastewater (also called sewage) is usually conveyed in a combined sewer or sanitary sewer, and treated at a wastewater treatment plant.

Untreated waste-water generally contains high levels of organic material, numerous pathogenic microorganisms, as well as nutrients and toxic compounds. It thus entails environmental and health hazards and consequently, must immediately be conveyed away from its generation sources and treated appropriately for reusing in modern technological processes. By-products from wastewater treatment plants such as screenings, grit and sewage sludge may be widely used in many branches of industry.

Belarus has the potential to use 1, 5 billion m^3 of domestic, industrial and commercial wastewater every year. The quantity of sludge waste that can be reused is 9112, 09 ton [3]. With the increase in population demands and the decrease in non-renewable natural resources, our manufacturers make an effort to reuse several types of waste in the production of new building materials. So the purpose of our research is using sludge waste for sustainable building material production at Belarusian plants.

Our paper investigates the influence of different sludge waste mixtures in structural ceramics by incorporating different amounts of deioning sludge, cationite KY-2-8, anionite AB-17-8 and anthracite waste as an additives. Clay mixture with these chemicals was used to mould clay bodies which were then fired at the temperatures of 900, 1000 and 1100C.

The declared method for ceramic products manufacturing leads to the reduction of charge mixture quantities. It can avoid metallic wear of technological equipment. Fuel consumption that is necessary for material burning is less than for common technological process. Our method can increase moisture permeability, sinterability and caking degree of material in the course of burning ceramic products in furnace. Waste of anthracites and hydroanthracites of various types that are used in water treatment processes has a certain granulometric composition. That is why they don't need preliminary preparation before use. Small pores form in ceramic products after burning-out. They increase the quality of a building material, it's durability and frost resistance. To make the technological process efficient the quantity of cationite KY-2-8, anionite AB-17-8 and anthracite should be in an interval of 0,1 – 60 % on weight de-

pending on the necessary density of a finished product and the expected result of fuel economy while burning process.

Morphological aspects were evaluated with the help of several laboratory tests that provide the physical and mechanical properties. Incorporation of our additives increases the water absorption and apparent porosity. Deironing sludge, cationite KY-2-8, anionite AB-17-8 and anthracite waste could be used as a secondary clay raw material to form ceramic products with excellent thermal insulation properties.

So our method for ceramic products manufacturing that is based on using Belarusian recycled resources can be considered as a part of sustainable building technology. It provides efficient use of energy, water and other resources. The method reduces waste, pollution and harm to the environment therefore it will protect people's health and improve employee productivity.

References

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Существует принципиальный раскол между содержанием-смыслом данного акта-деятельности и исторической действительностью его бытия, вследствие чего этот акт и теряет свою ценность и единство живого становления и самоопределения. Каждая мысль с ее содержанием есть индивидуально-ответственный поступок, один из поступков, из которых слагается вся единственная жизнь как сплошное поступление, ибо вся жизнь в целом может быть рассмотрена как некоторый сложный поступок: я поступаю всей своей жизнью, каждый отдельный акт и переживание есть момент моей