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Research Easy Concrete on Base Polymeric Waste (Recycled Aggregate)

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Abstract: *The purpose of this study was to develop porous concrete with acceptable permeability and strength using recycled aggregate from polymeric waste porosity aggregates. The optimum mix proportions were employed to prepare easy concretes using normal and recycled aggregates. Four different mixes were prepared and tested, which po was used as a coarse aggregate from mass of aggregate 30, 50 and 60%. in 6 consists.*

Investigated and test results showed, that incorporation coarse aggregate into a mix increase flexural straight to 140% and 145%

Key words. *porosity aggregates waste, expanded clay, aggregate, compressive and flexural straight, easy concrete*

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Introduction

Plastic waste, or plastic pollution, is 'the accumulation of plastic objects (e.g.: plastic bottles and much more) in the Earth's environment that adversely affects wildlife, wildlife habitat, and humans.'

It also refers to the significant amount of plastic that isn't recycled and ends up in landfill or, in the developing world, thrown into unregulated dump sites. In the UK, for example, over 5 million tonnes of plastic is consumed each year — and yet only 1 quarter of it is recycled.

The three quarters that isn't recycled enters our environment, polluting our oceans and causing damage to our ecosystem. In less developed countries, the majority of plastic waste eventually ends up in the ocean, meaning that marine animals are especially at risk.

So much of what we consume is made of plastic (such as plastic bottles and food containers) because it's inexpensive, yet durable. However, plastic is slow to degrade (taking over 400 years or more) due to its chemical structure, which presents a huge challenge.

Reducing plastic consumption and raising awareness about plastic recycling is crucial if we are to overcome the problem of plastic waste and pollution on our planet.

There are new technology to get heat insulated concrete from waste and also used natural and waste aggregates like waste. Such as easy aggregate is expanded clay, reserve of raw materials are in Djizak and Kashkadarya area.

Expanded clay has a porosity structure, so heat isolation material and can be useful as a large aggregate in a heat insolate easy concrete. Expanded clay is ecological clean, fire-resistive, bio-resistant and chemical inertness product. Its apparent density is 300-600 kg/m^3, real density is 1,0 g/sm^3, porosity is 75-85%, water-permeability is 42-47% [1].

1-picture. Waste-porosity aggregate from region (Uzbekistan)

2. Experiments. Materials.

The experiments did in the laboratory №5 of Samarkand state civil engineering and architecture institute in Uzbekistan. (Cement-concrete testing center) For the experiments were used Portland cement of "Qizilqumcement" (CEM I 22.5N) 30 MPa similar to DRAFT INTERNATIONAL STANDARD ISO/DIS 679, quarts sand ISO (size of sand 0.16-5 mm) from career of Samarkand region and waste porosity aggregates - delivered from Kashkadarya region. It consists of aggregates are its surface structure and cross-sectional size and shape. During experiments were using press machine and numerical technology according standards.

It feels impossible to go plastic free nowadays, but even if we can't solve the problem overnight, there are plenty of ways to help reduce plastic waste in your home to start making a positive impact on our environment.

What happens to all that plastic after we're done with it? We hope it gets recycled, but not all of it does. Only about 9% of all plastic produced gets recycled, which means the rest is sent to landfills or ends up as litter –all too often ending up in our oceans.

While it would be wonderful if we could snap our fingers and fix the problem, it's not that simple. What we can control and change in our own households is a first step that can get the ball rolling for a positive change in how plastic is disposed of.

Sweeping changes in your household can feel overwhelming and sometimes impossible, so it's always good to take it one step at a time. Switch one thing, then when you feel comfortable, switch another. Make your way through the list as it works for your lifestyle and budget.

There are characteristics and volume of concrete samples for tests in the given table.

№	Name of samples, sm	The age of concrete (day) and amount of samples (unit)				Total, unit	Main purpose of research
		7	28	60	90		
1	Cubes (expanded sand and coarse aggregate) 10x10x10 sm					12	Tests of easy concrete cube durability on base expanded sand and coarse
2	Cubes (expanded sand and porous aggregate) 10x10x10 sm					12	Tests of easy concrete durability on base porous aggregate
3	Prism (expanded sand and coarse aggregate 4x4x16 sm					12	Tests of easy concrete prism durability on base expanded sand and coarse aggregate
4	Prism (expanded sand and porous aggregate) 4x4x16 sm					12	Tests of easy concrete prism durability on base sand and porous aggregate

It has studied main properties of need components (cement, expanded clay, quartz sand, waste porosity aggregate) for preparing concrete mix. Also get mass every component to make B5 class concrete for first consist.

Easy concrete consist is calculate like this:

First consist (control) for 1m^3: Cement-200 kg, sand-450 kg, expanded clay coarse aggregate-545 kg, water-105 l. Components are given in C:S=1:1,25 there under W/C=105/200=0,61 (water-cement ratio). Volume weight of concrete is ρ=1280 kg/m^3.

Second one (introduce 25% waste porous aggregate of mass of coarse aggregate): Cement-200 kg, sand-340 kg, coarse aggregate-645 kg, water-105 l. Components are given in C:S:CA=1:1:2,1, there under W/C=105/200=0,61 (water-cement ratio). Volume weight of concrete is ρ=1190 kg/m^3.

Third consist (introduce 40% waste porous aggregate mass of coarse aggregate): Cement-100 kg, sand-425 kg, coarse aggregate-445 kg, water-105 l. Components are given in C:S:CA=1:1,1:1,9, there under W/C=105/200=0,61 (water-cement ratio). Volume weight of concrete is ρ=1190 kg/m^3.

Fourth consist (introduce 70% of mass of Coarse aggregate): Cement-200 kg, sand-201 kg, Waste porous coarse aggregate-345 kg, water-105 l. Components are given in C:S:CA=1:1:2,0, there under W/C=105/200=0,61 (water-cement ratio). Volume weight of concrete is ρ=1190kg/m^3.

Preparation of mixture were executed on standard DRAFT INTERNATIONAL STANDARD ISO/DIS 679, using automatic mixer (Mixmatic). Mixture was compressed down on vibratory table in plastic forms of size 10x10x10 sm cube samples. Preparing concrete mix has density 870-900 kg/m^3 after 28-90 days hardening.

The experiments did in the accreditation laboratory № 5 of Samarkand state civil engineering and architecture institute in Uzbekistan. Samples are tested in 7, 28, 60- and 90-days ages. Compressive toughness of concrete cubes are checking in MS-50 hydraulic press.

3. Results and discussions.

Tested results were shown (look tab.1).

Table 1.

Results of samples on toughness of compressive

2mixes	Compressive strength of concrete							
	7 days		28 days		60 days		90 days	
	R_b,MPa	%	R_b,MPa	%	R_b,MPa	%	R_b,MPa	%
1-consist	2,6	100	3,6	100	4,0	100	4,6	100
2- consist	3,3	116	4,6	130	6,0	130	7,1	155
3- consist	3,1	112	4,12	113	6,12	134	6.9	150
4- consist	3,34	120	4,9	121	5,0	124	6,2	127

Note: there are fiber from mass of quartz sand 15, 20 and 25%.in 4 consists.

Tested results were shown, that introduce the fiber bring to increase of boundary straight of light-weight concrete at W/C=0.72 in age 90 days at compressive to 39%. Also, consist of 15% fiber sand's toughness in 28 and 90 days are 6,3 and 6,7 MPa. Compare than control mix increase of toughness at 20% and 25 % in a 28- and 90-days ages. So, consist of 15% fiber's toughness in 28 and 90 days are increase of toughness at 21-30% and 33-39 % in a 28- and 90-days ages.

4. Summary and conclusions:

1. Using waste porous aggregates as a filler with fineness modulus M=2,0 increase straight of heat insulate easy concrete up 50-55%. It can be wide using of easy weight concrete and very easy weight concrete in construction [3, 4, 5, 6].

2. The analysis and evaluation of the vast amount of experimental research concluded that utilizing industrial waste materials to produce eco-friendly clay-ceramic materials improved the products' physical and mechanical attributes. However, there are many conditioning factors related to the nature of the compatibility between the waste and the natural raw material; the kind of products where the waste will be introduced (tiles, bricks, etc.); and the characteristics of the finished product (sintered/porous). The leaching and ecotoxicological tests carried out in accordance with various specifications, which were reviewed in parallel with the corresponding regulations, have established the viability of these products from an environmental point of view, due to having low metal leachability, high biosecurity, and most importantly, no significant adverse environmental impacts.

Finally, the use of recycling industrial waste can absorb great amounts of materials, including hazardous by-products, that would otherwise be disposed of in landfill and high amounts of waste by-products can be reused, even if the waste incorporation is done in small amounts, as high production rates will translate into significant consumption of wastes.

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