EUROPEAN JOURNAL OF LIFE SAFETY AND STABILITY (EJLSS)
ISSN 2660-9630
www.ejlss.indexedresearch.org Volume 14, 2022 ||

Properties of Easy Concrete from Waste Porosity Aggregates (Recycled Aggregate)

Kuldashev Kh.
Professor of Samarkand State architectural and civil engineering institute

Qo'ziboyev A.
Teacher of Samarkand State architectural and civil engineering

Esonov Sh.
Student of Samarkand State architectural and civil engineering

Abstract: *The purpose of this study was to develop porous concrete with acceptable permeability and strength using recycled aggregate from 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 25, 40 and 75%. in 6 consists.*

Investigated and test results showed, that incorporation coarse aggregate into a mix increase flexural straight to 150% and 155%

Keywords: *porosity aggregates waste, expanded clay, aggregate, compressive and flexural straight, easy concrete.*

Date of Submission: 29-01-2022 ***Date of Acceptance: 24-2-2022***

----

1. Introduction.

Modern life now, to build and construction houses and other service house buildings are developed. Particularly, it can be reduce price of construction for heat insulating and energy-save houses and buildings from light-weight concrete in a places where are enough raw materials for it. Light-weight concrete and very light-weight concrete are main material in a part of building construction. This kind of material is calculated different type for using and standards. Day by day it is on the increase for building materials and products and quality of them.

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].

Expanded clay aggregates were produced from natural plastic clay and aluminum scrap recycling waste (ASRW), which were obtained as a result of recovering Al metal from black dross by using conventional metallurgical process). ASRW contains aluminum nitride (AlN—on average 5 wt%), aluminum chloride ($AlCl_3$—on average 3 wt%), potassium and sodium chlorides (total 5 wt%), and iron sulfite ($FeSO_3$—on average 1 wt%).

1-picture. Waste-porosity aggregate from Kashkadarya 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.

The effect of recycled aggregate on total void ratio, strength and permeability was examined. The total void ratio of porous concrete incorporating recycled aggregate was larger than that of porous concrete with normal aggregate. The addition of polymer modification resulted in a slight decrease in total void ratio regardless of type of aggregate. The compressive strength of easy concrete using recycled aggregate was lower the one using normal aggregate. However, the compressive strengths of porous concretes using normal and recycled aggregates were significantly improved by 50% and 55% respectively. The use of recycled aggregate along with optimum content produce acceptable porous concrete with both enough drainage and strength properties.

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-300 kg, sand-350 kg, expanded clay coarse aggregate-445 kg, water-205 l. Components are given in C:S=1:1,25 there under W/C=205/300=0,68 (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-300 kg, sand-240 kg, coarse aggregate-745 kg, water-205 l. Components are given in C:S:CA=1:1:2,1, there under W/C=205/300=0,68 (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-300 kg, sand-325 kg, coarse aggregate-545 kg, water-205 l. Components are given in C:S:CA=1:1,1:1,9, there under W/C=245/300=0,68 (water-cement ratio). Volume weight of concrete is ρ=1190 kg/m^3.

Fourth consist (introduce 70% of mass of Coarse aggregate): Cement-300 kg, sand-201 kg, Waste porous coarse aggregate-345 kg, water-205 l. Components are given in C:S:CA=1:1:2,0, there under W/C=205/300=0,68 (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	2,88	100	3,9	100	4,0	100	4,9	100
2- consist	3,32	116	4,8	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.

5. References:

1. Turdimurod o'g, J. Q. L., Shahriyor, A., & Aziza, K. (2021). Concrete Products from Waste Materials. European Journal of Life Safety and Stability (2660-9630), 12, 99-102.

   EUROPEAN JOURNAL OF LIFE SAFETY AND STABILITY (EJLSS)

   ISSN 2660-9630. www.ejlss.indexedresearch.org Volume 12, 2021. http://ejlss.indexedresearch.org/index.php/ejlss/article/view/274.

2. Aziza, K., & Kh, K. (2021). DURABILITY CHARACTERISTICS OF CONCRETE ADMIXED WITH WOLLASTONITE MINERAL. European Journal of Life Safety and Stability (2660-9630), 5, 9-13.

   EUROPEAN JOURNAL OF LIFE SAFETY AND STABILITY (EJLSS) ISSN 2660-9630. www.ejlss.indexedresearch.org Volume 5, 2021

   http://ejlss.indexedresearch.org/index.php/ejlss/issue/view/5.

3. Kuldashev, H., & Kuldasheva, A. Improvement Of Vertical Butting Seismic-stability Large-panel Buildings. JournalNX, 210-215.

   JournalNX - a Multidisciplinary Peer Reviewed Journalю ISSN No.(E):2581-4230 https://journalnx.com/journal-article/20151680.

4. Ibragim, U., Erkin, E., & Aziza, K. (2021). Physical Properties of High Performance Concrete on Base Wollastonite. European Journal of Life Safety and Stability (2660-9630), 11, 101-105.

   EUROPEAN JOURNAL OF LIFE SAFETY AND STABILITY (EJLSS) ISSN 2660-9630

   www.ejlss.indexedresearch.org Volume 11, 2021 ||

http://ejlss.indexedresearch.org/index.php/ejlss/issue/view/11.

5. Mamatqosim, B., & Aziza, K. (2021). Reinforcing in the Production of Gypsum Materials on Base Wollastonite Fibers. European Journal of Life Safety and Stability (2660-9630), 12, 20-23.

   EUROPEAN JOURNAL OF LIFE SAFETY AND STABILITY (EJLSS) ISSN 2660-9630

   www.ejlss.indexedresearch.org Volume 11, 2021 ||

   http://ejlss.indexedresearch.org/index.php/ejlss/issue/view/11.

6. Kuldasheva, A., Saidmuratov, B., & Kuldashev, H. (2020). The Use of Wollastonite Fiber to Enhance the Mechanical Properties of Cement Compositions. International Journal of Progressive Sciences and Technologies, 22(2), 37-45.

   International Journal of Progressive Sciences and Technologies (IJPSAT) ISSN: 2509-0119.

   https://ijpsat.ijsht-journals.org/index.php/ijpsat/article/view/2175.