EUROPEAN INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY RESEARCH AND MANAGEMENT STUDIES

VOLUME03 ISSUE01
DOI: https://doi.org/10.55640/eijmrms-03-01-23 Pages: 144-149

SPECIAL COMPOUNDS FROM INDUSTRIAL WASTE

Shavkat T. Rakhimov
Phd, Associate Professor, Tashkent Institute Of Architecture And Civil Engineering, Uzbekistan

Nomazov Ikram
Master Student, Tashkent Institute Of Architecture And Civil Engineering, Uzbekistan

ABOUT ARTICLE

Key words: Individual-property rights, honor, dignity, right to name, business reputation, state name, state secret, official (personnel).

Received: 20.01.2023
Accepted: 25.01.2023
Published: 30.01.2023

Abstract: Currently, in the mining industry of our Republic, there is an increased interest in the issue of filling the voids formed in the exploited ore deposits. The increase in the extraction of minerals from the ground, the preservation of the rock layer above the aquifers, as well as the safe performance of mining operations, led to the development of the filling system in existing ore deposits in our country and abroad [1].

INTRODUCTION

Mines in the territory of the Republic of Uzbekistan have certain mining and geological conditions, the use of filler system in the use of techniques and technologies in their processing is economically effective. The use of industrial waste and secondary products is economically effective compared to the use of natural raw materials, it saves the costs of geological exploration, exploitation and construction of mines, fuel, energy and transport costs are significantly reduced, and the cost of mined ore is reduced the level of land under the piles is reduced, environmental cleanliness is achieved.

One of the most promising ways of using industrial waste is to use it as a building material in production. This meets 40% of the demand for raw materials. When industrial waste is used in the production of construction materials, compared to the production based on natural raw materials, a 10-30% reduction in costs is achieved, while capital investments are saved by 30-50%. The development and renewal of production of building materials, the increase in economic efficiency at the modern stage is

achieved directly through the comprehensive use of local raw materials and various industrial wastes [2].

In Russia, Ukraine, Uzbekistan, Azerbaijan and other countries, from the waste generated during the mining of marble and granite slabs, crushed stone, marble stone, marble powder and flour, artificial mosaic tiles, various wall materials, small to large aggregates for concrete and mixtures. It is used in the production of fillers.

THE MAIN FINDINGS AND RESULTS

In order to solve the problem of using existing local materials and new industrial wastes in the production of backfills, the following were selected: sand from the crushing of loose rocks from the opening of the Kauldi ore mine, dusty waste from marble processing and Oxangaron portland cement produced in a cement plant.

In this case, the following issues were resolved: it is possible to obtain filling mixtures that meet regulatory requirements; development of the optimal composition of filler mixtures using portland cement from 100 to 300 kg/m3 at intervals of 50 kg/m3; determining the technological parameters of placing filling mixtures in the voids formed during the processing of ore deposits, their preparation and transfer; study of rheological, physico-mechanical, deformation, reliability and long-term durability properties of filler mixtures; Conducting production approvals at Kauldi ore mine on the basis of received filler mixtures, substantiating economic efficiency, preparation of regulatory documents regulating consumables, filler mixture preparation technology and quality control [3].

When developing the composition of the filler mixture, the following materials were selected:

- Grinding of loose rocks in a crusher installed in Kauldi ore mine. The size of the sand is 5 mm and smaller.
- Use of sand obtained on the basis of plasticizing additives and loose rocks to improve the properties of marble processing waste. In this case, marble processing waste is used in its natural form without any additional processing.
- UzRST 30515-97 produced at the Okhangaron cement plant. Cements. 400 grade portland cement that meets the requirements of general specifications.
- UzRST 818-97. Water for concrete and mix. Water that meets the requirements of technical conditions.

The loose rock used in the extraction of sand for aggregates consists of the following minerals: dolomites - mineral, SaMg (SO3)2 Mg, limestone, calcite, andesite, quartz, syenite. In addition, small amounts of hydromicas, metosamotites, pyrite, etc. are found. The minerals of the mentioned rocks have approximately the same volumetric mass and density of 2.65 - 2.85 g/cm3.

The porosity of the rock is from 0.55 to 2.22%, the water absorption is 0.21-0.86%, the average compressive strength is 523-638 kgs/cm2, the crushing zone at the place of technical failure decreases the strength of the rock and 162 - is 202 kgs/cm2.

A 250 kg sample of loose rock-based sand from the “Kauldi” are mine was taken and the optimum composition was determined by passing through a set of standard sieves with a mesh size of 5 mm and smaller, suitability of sand for filling mixtures “UzRST 730-96. Sand for construction work, it was determined on the basis of research methods. Analysis of the granulometric composition of sand is presented in Table 1.

Granulometric composition of sand

Table 1

№	Size of sieve meshes, mm	Some residue, %	Full balance, %
1	10	0	0
2	5	7-8	7-8
3	2,5	41-42	48-50
4	1,25	28-30	76-80
5	0,63	2-3	78-83
6	0,315	10-11	88-94
7	0,14	3-4	91-98
8	tag	1,5-2	92,5-100

The chemical composition of marble processing waste used for filling mixtures, the amount of oxides by mass, in % was as follows: SiO2 – 0,50; AL2 O3 – 0,44; CaO -55,10; Fe2O3 -0,36; MgO – 0,25; CO2-45,03; K2O +Na2O3-0,12; P.P.P. - 0,10; a residue insoluble in water - 0,32%.

The chemical composition and physical-mechanical properties of 400 brand Portland cement produced at the Okhangaron cement plant are presented in Table 2 and Table 3.

Chemical composition of Portland cement

Table 2

Naming	Amount of oxides, % by mass								
	SiO_2	AL_2O_3	Fe_2O_3	CaO	MgO	MpO	CO_3	K_2O +Na_2O_3	P.P.P.
Portland cement 400 brand	21-24	4-7	2-4	60-63	1-2	1,1-1,5	0,2-0,3	0,3-0,7	0,6-0,7

Description of Portland cement

Table 3

Naming	Degree of grinding, sm^2/g	Duration of bite		Aktivligi, MPa, sinovda	
		Beginning	The end	Bending over	In compression
Portland cement 400 brand	2900	1h.30 min.	5h.15 min.	6.2	32.7

When determining the optimal composition of filler mixtures, two options were selected depending on the mixture of consumable components:

1. Portland cement grade 400, loose rock based sand and water;

2. 400 grade Portland cement, loose rock based sand, one part marble processing waste as sand and water.

The mathematical method of experimental planning was used to develop the optimal composition of filler mixtures, it was checked experimentally and computationally, samples of filler mixtures were prepared in laboratory conditions, rheological and physical-mechanical properties of mixtures and hardened samples were determined [4, 5].

As mentioned above, two components were used in the development of the technology for the preparation of filler mixtures. Initially, Portland cement consumption of -150, 180 and 210 kg per 1 m3 of backfill mixture and loose rock based sand with a size of 2.5 mm and smaller were selected and tested. The consumption of components for the filling mixture and their quality indicators are presented in Table 4.

Optimum composition of loose rock-based sand fillers for Kauldi mine

Table 4

Samples	The amount of materials is 1 m^3 mixture for, kg			The mobility of the mixture, cm	Average compressive strength, MPa
	Portland cement 400 marks	Loose rock-based sand, 2.5mm and smaller	Suv, l		
I	150	1300	250	12-14	8,8
II	180	1300	250	12-14	9,7
III	210	1300	250	12-14	13,5

The mathematical method of experimental planning was used to develop the optimal composition of filler mixtures, it was checked by experimental-calculation method, samples of filler mixtures were prepared in laboratory conditions, rheological and physical-mechanical properties of mixtures and hardened samples were determined. The production of cheap and standard building materials and mixtures based on existing industrial waste in the territory of our republic allows to improve the ecological situation of the environment, expand the used land areas, and meet the demand for building materials.

REFERENCES

1. Rakhimov Sh.T. Filler mixtures obtained from sands based on loose rocks in the mining and metallurgical industry. Collection of materials of the Republican scientific-practical conference “Functional bases of building design”. - Tashkent. - TOO. -2015. -117-120 p.
2. Rakhimov Sh.T. Development of the optimal composition of filler mixtures based on industrial waste, research of physical and technical properties, long-term durability and efficiency. Abstract prepared for obtaining the degree of Doctor of Philosophy (PhD) in technical sciences. - Tashkent. - 2019.-17 p.
3. UzRST 30515-97. Cements. General technical conditions.
4. KMK 3.03.06-99. Prigotovlenie i primenenie stroitelinix rastrovov.
5. Own RST 818-97. Water for concrete and mix. Technical conditions.