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ABU RAYHON BERUNIY NOMIDAGI URGANCH DAVLAT
UNIVERSITETIDA 15-16-SENTABR

“QURILISH VA ARXITEKTURA SOHASIDAGI INNOVATSION
G‘OYALAR, INTEGRATSIYA VA TEJAMKORLIK” MAVZUSIDAGI
RESPUBLIKA MIQYOSIDAGI ILMIY VA ILMIY-TEXNIK
KONFERENSIYA MATERIALLARI

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“INNOVATIVE IDEAS, INTEGRATION, AND ECONOMY IN THE
FIELD OF CONSTRUCTION AND ARCHITECTURE”
SCIENTIFIC AND PRACTICAL REPUBLICAN CONFERENCE

РЕСПУБЛИКАНСКАЯ НАУЧНО-ПРАКТИЧЕСКАЯ
КОНФЕРЕНЦИЯ «ИННОВАЦИОННЫЕ ИДЕИ, ИНТЕГРАЦИЯ И
ЭКОНОМИКА В ОБЛАСТИ СТРОИТЕЛЬСТВА И АРХИТЕКТУРЫ»

URGANCH-2025

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ILMIY-TEXNIK ANJUMAN DASTURIY QO‘MITASI:

Rais: “ARXITEKTURA, QURILISH, DIZAYN” ilmiy-amaliy jurnalining bosh muharriri, i.f.d., prof. **Nurimbetov Ravshan Ibragimovich**

Abu Rayhon Beruniy nomidagi Urganch davlat universitetida 2025 yil 15-16-sentabr kunlari “Qurilish va arxitektura sohasidagi innovatsion g‘oyalar, integratsiya va tejamkorlik” mavzusidagi respublika miqyosidagi ilmiy va ilmiy-texnik konferensiya materiallari kiritilgan.

To‘plamga kiritilgan maqolalar mazmuni, ilmiy salohiyati va keltirilgan dalillarning haqqoniyligi uchun mualliflar mas’uldirlar.

oladigan bo'lsak qurilishda yengil betonlardan foydalanish konstruktiv xarajatlar jihatdan ham iqtisodiy yutuqqa erisha olishimizni ta'minlaydi.

FOYDALANILGAN ADABIYOTLAR

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TO INVESTIGATE THE MATHEMATICAL MODELING OF THE PROPERTIES OF EFFECTIVE CERAMIC PASTE WITH BURNT ADDITIVES FROM AGRICULTURAL WASTE

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Abstract

Results of scientific research on determination of optimum prescription and technological parameters of effective ceramic brick with burn-out additives, obtained by the method of mathematical planning of experiments are given in the article.

Keywords

porous ceramics, brick, burn-out additives, mathematical planning of experiments, a dosage of technological additive, forming moisture content, pressure in an extruder.

At present, with increasing regulatory requirements for thermal resistance of external enclosing structures of residential buildings in the Republic of Uzbekistan, a special attention is paid to the issue of increasing the thermal insulation characteristics of the traditional and most affordable local building material ceramic bricks. One way to increase the thermal insulation properties of ceramic bricks is an addition of organic burn-out additives to the clay mass. This method, along with a

significant increase in the porosity of ceramic brick, also allows the utilization of massive industrial and agricultural waste.

Urgench State University and Construction for several years has been conducting theoretical and experimental research to substantiate the possibility of obtaining a highly effective ceramic brick with technological additives based on cotton stems – “guza-paya”.

This article presents the results of mathematical modeling of the properties of effective ceramic bricks with burn-out additives from agricultural waste. To model the properties of effective ceramic bricks, the method of mathematical planning of experiments is used [1].

In the process of modeling, the following prescription and technological parameters are chosen as variable factors:

x_1 - dosage of technological additive in % of clay mass;

x_2 - forming moisture content, %;

x_3 - pressure in the extruder, MPa.

Intervals and levels of factor variation are presented in Table 1.

The levels of remaining factors are stabilized for the whole experiment. The firing of samples is carried out at temperature 1000°C.

B3 type of experiment plan is chosen as a planning matrix.

To implement the planning matrix, samples have been produced and tested in accordance with the current governmental standards. The main characteristics of the plan and the experiment plan in coded and natural values of variables are presented in Tables 1 and 2

Table 1.**Main Characteristics of the Plan**

Code	Value of code	Values of factors		
		X ₁	X ₂	X ₃
		Dosage of technological additive, %	Forming moisture content, %	Pressure in the extruder, MPa
Basic level	0	10	20	1,2
Variation interval		5	4	0,2
Upper level	+1	15	24	1,4
Lower level	-1	5	16	1,0

During the tests at a temperature of 1000⁰ C, the structural strength of freshly formed samples, their average density and compressive strength were established.

Average values of experimental data for each point of the plan are given in Table. 2. As a result of experiment plan implementation, compositions of ceramic masses which differ in a wide range of physical-mechanical properties were obtained by the method of plastic forming. The range of changes in experimental values of indicators is given in Table 3.

Table 2.**Experiment plan in coded and natural values of variable factors**

No of experiments	Experiment plan			Natural values of experiment		
	X ₁	X ₂	X ₃	X ₁	X ₂	X ₃
1	+1	+1	+1	15	24	1,4
2	+1	+1	-1	15	24	1,0
3	+1	-1	+1	15	16	1,4

4	-1	+1	+1	5	24	1,4
5	-1	-1	-1	5	16	1,0
6	-1	+1	+1	5	24	1,4
7	-1	-1	-1	5	16	1,0
8	+1	-1	-1	15	16	1,0
9	+1	0	0	15	20	1,2
10	-1	0	0	5	20	1,2
11	0	+1	0	10	24	1,2
12	0	-1	0	10	16	1,2
13	0	0	+1	10	20	1,4
14	0	0	-1	10	20	1,0
15	0	0	0	10	20	1,2

Table 3.

Results of experiment plan implementation

No of experi ments	Levels of variation factors			Average values of experimental results		
	X ₁	X ₂	X ₃	R _{сгп} , MPa	R _{сж} , MPa	ρ _{ср} , kg/m ³
1	+1	+1	+1	2,07	10,45	1080
2	+1	+1	-1	1,48	10,35	1045
3	+1	-1	+1	1,70	6,80	1096
4	-1	+1	+1	1,51	8,15	1042
5	-1	-1	-1	0,67	4,40	980

6	-1	+1	+1	1,01	5,55	1020
7	-1	-1	-1	1,23	5,70	1005
8	+1	-1	-1	1,19	5,00	986
9	+1	0	0	1,85	9,25	1065
10	-1	0	0	1,36	5,15	1035
11	0	+1	0	1,71	8,65	1070
12	0	-1	0	0,93	5,55	1032

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ПОЛУЧЕНИЯ ИЗВЕСТКОВО-СИЛИКАТНЫХ МАТЕРИАЛОВ ИЗ СЫРЬЕВОЙ СМЕСЕЙ В АВТОКЛАВНЫХ УСЛОВИЯХ

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PREFORMING CALCAREUS-SILICATE MATERIAL OUT OF RAWMEAL AVTOKLAVE CONDITIONS

Аннотация

Настоящее исследование имело целью найти такой состав сырьевой смеси, который обеспечивал бы наиболее благоприятные условия для