TECHNOLOGY OF OBTAINING PRIMARY CALCIUM BINDERS BY RECYCLING ENTERPRISE WASTE

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Abstract: *This scientific article is based on the fact that modern production industry needs to solve issues such as efficient use of raw materials and energy resources, producing high quality construction materials from local raw materials and secondary raw materials.*

Especially to determine the efficiency of the product obtained from the waste of porcelain and ceramic production enterprises and to compare it with the requirements of GOST. Binders were used to increase its strength.

Key words: *gypsum waste, waste of porcelain and ceramic production enterprises, Lime binder, magnesium binder, $Ca(OH)_2$. Construction plaster.*

KORXONA CHIQINDILARINI QAYTA ISHLAB, BIRLAMCHI KALSIYLI BOG'LOVCHILAR OLISH TEXNOLOGIYASI

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Annotatsiya: *Ushbu ilmiy maqola hozirgi zamon ishlab chiqarish sanoati xomashyo va energiya resurslaridan unumli foydalanish, mahalliy xom ashyolardan hamda ikkilamchi xomashyolardan sifatli qurilish materiallari olish kabi masalalarni yechish zaruriyati mavjudligidan iboratdir.*

Ayniqsa chinni va sopol buyumlari ishlab chiqarish korxonalari chiqindilardan olingan maxsulotning samaradorligi aniqlash va GOST talablariga solishtirish. Uning mustaxkamligini oshirish uchun bog‘lovchi moddalardan foydalanilgan.

Kalit so‘zlar: *gips chiqindisi, chinni va sopol buyumlari ishlab chiqarish korxonalari chiqindilari, Oxakli bog‘lovchi, magneziyal bog‘lovchi, Ca(OH)2. Qurilish gipsi.*

ТЕХНОЛОГИЯ ПОЛУЧЕНИЯ ПЕРВИЧНЫХ ВЯЖУЩИХ КАЛЬЦИЯ ПУТЕМ ПЕРЕРАБОТКИ ОТХОДОВ ПРЕДПРИЯТИЙ

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Аннотация: *Данная научная статья исходит из того, что современной производственной отрасли необходимо решать такие вопросы, как эффективное использование сырья и энергетических ресурсов, производство высококачественных строительных материалов из местного сырья и вторичного сырья.*

Специально для определения эффективности продукта, полученного из отходов предприятий фарфорового и керамического производства, и сравнения его с требованиями ГОСТа. Для увеличения прочности использовались связующие.

Ключевые слова: *гипсовые отходы, отходы предприятий фарфорового и керамического производства, Известковое вяжущее, Магниевое вяжущее, Ca(OH)2. Строительная штукатурка.*

INTRODUCTION

At present, it can be said that the main strategic projects for the production of modern construction materials based on industrial waste for nature protection have been developed in the Republic of Uzbekistan. The goal of these projects is the effective use of natural resources while ensuring the further development of the economy of Uzbekistan. A number of measures such as maintaining the balance of the production and consumption processes of renewable natural resources, the production of non-renewable resources, the rational use of waste, as well as the restoration of the regenerative nature of nature at the regional and local levels, as well as the preservation of the original species of nature and their gene pool, the diversity of the landscape - consists of events. In this regard, one of the main directions is to reduce the cost of manufactured construction materials, products and constructions and to develop energy-efficient production technology using industrial waste.

LITERATURE ANALYSIS

More than 50 gypsum wastes can be listed in the national economy, among which phosphogypsum is the largest. Wastes are produced in different volumes, and phosphogypsum slags amount to several million tons. It is intended to express the aspects of the use of chemical industry wastes as secondary resources as follows: obtaining binders based on phosphogypsum and other gypsum-containing wastes. In this field, the innovative technologies of preparation of binders (modified phosphogypsum, multimineral cement, etc.) created by Professor T.A. Otaqo'ziyev and his school deserve attention. Similar science-based technologies have been introduced in Russia, Lithuania, Armenia, Bulgaria, and other countries. In Bulgaria, the production of phosphogypsum products by extrusion method without washing, and in Belarus the technologies of polymer phosphogypsum preparation are noteworthy [2].

It makes up 70% of the raw materials, materials, heat energy used in the industry of our country. At the same time, from 10% to 99% of used raw materials turn into waste that pollutes the environment and is released into water bodies, air and the surface of the earth. The use of industrial waste products in the preparation of modern construction materials satisfies the demand for raw materials up to 40%. Compared to the production of building materials from natural raw materials, the use of industrial waste allows to reduce the cost of production by 10-30%, as well as the possibility of saving 35-50% of capital funds.

RESULTS

The samples taken from the waste of porcelain and ceramic production enterprises were processed at different times and temperatures.

1 table

Results obtained on the processing of gypsum waste

No	Heating temperature	Heating time min	Mass reduction g	Dehydration %	Gypsum / water ratio	Dehydration speed min	Hardening time min
1	180 °C	30	5 , 9	19.67	1:1 , 5	60	42
2	**220 °C**	**30**	**6 , 15**	**20 . 5**	**1:1 , 5**	**27**	**40**
4	240 °C	30	6,155	20,51	1:1 , 5	60	85

The waste gypsum was heated at different temperatures to expel the water contained in it. As a result of heating, it was not noticed that the plaster almost hydrates above the temperature of 220 ^{o} C. It turned out that 95% of the absorbed water is excreted at this temperature. Dehydration time was found to be shorter than the rest of the samples. The rate of solidification of the samples in the mass ratio of 1:1.5 to water was determined. According to him, samples were tested at a temperature of 220 ^{o} C, so less time was spent on sample hardening.

The water hardening times of the samples were determined. The GOST 125-2018 type of gypsum used for construction and agriculture usually hardens within 30-45 minutes. When the samples were compared with each other, it was found that the second sample took less time than the others. of the sample taken at high temperature the main reason it takes a long time to harden . It is explained by the fact that it absorbs part of the water in the air during cooling.

2 table

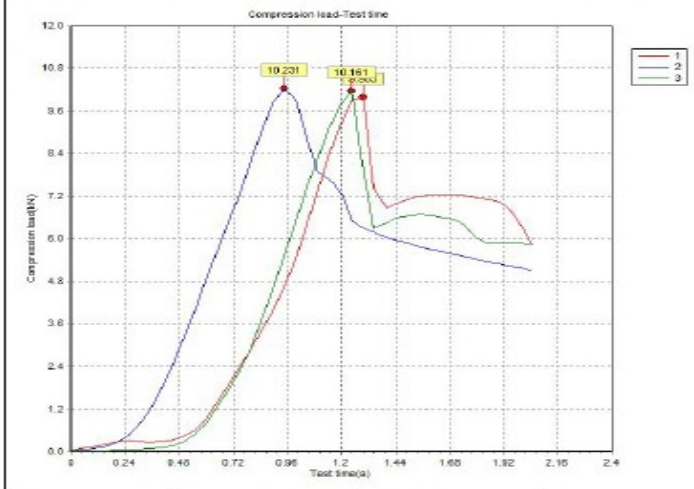
No	Sample quantity g	Heat up temperature	Heat up time min	Mass decrease g	%	Hype and water ratio	Dehydration speed min	Hardening time min
1	30	220 ^{o}C	20	7.6	25.33	1:1	17	54
2	30	220 ^{o}C	60	6.07	20.23	1:1	7	19
3	30	220 ^{o}C	20	7.6	25.33	1:1.5	14	54
4	30	220 ^{o}C	60	6.07	20.23	1:1.5	20	53

The hardening of samples heated at the same temperature and in different time intervals under the influence of water in different proportions was studied. According to the results of the study, the mass reduction at the same temperature and different time intervals showed a result of 20-25%. The solidification time of the sample taken at 220 oC for 60 minutes was less time spent. The results of the experiment show that the solidification rate of the sample obtained in a ratio of 1:1 was much more effective than that of technical plaster used in construction.

GOST from a gypsum sample prepared based on the results. According to the requirements of 23789-2018, the level of compressive strength was checked using the 4x4x4 cm AlfaTest device (Fig. 1).

Figure 1. AlphaTest device

Статистический вывод	№	Direction	Length (mm)	Width	Gap of clamps	Tear strength (N)
	1	40	40.0	40.0	10.0	9985.0
	2	40	40.0	40.0	10.0	10230.5
	3	40	40.0	40.0	10.0	10161.0
Avg. value						10.13



Время теста	20.11.2023 15:32:25	Оператор	Оператор

Figure 2. Production of porcelain and earthenware

samples taken from the waste of production enterprises to squeeze endurance .

The result **Pa=N/m ^{2}** formula using count **Pa=10300/0.0016=6437500**

mPa =Pa/100000 or **mPa =6437500/100000=6.4**

A sample taken from the waste of porcelain and ceramic production enterprises to squeeze endurance level to the requirements of GOST 125-2018 mostly G-6 brand construction plaster right coming was determined .

The obtained gypsum sample was tested for bending strength according to the requirements of GOST 23789-2018 by casting 4x4x16 cm samples using the AlfaTest device (Fig. 3).

Статистический пункт	№	Толщина (mm)	Ширина (mm)	Макс. нагрузка (N)	Макс. напряжение (MPa)
	1	40.00	40.00	1059.00	0.66
	2	40.00	40.00	1046.50	0.65
	3	40.00	40.00	917.50	0.57
Avg. value				1007.67	1
Max. value				1059.00	
Min. value				917.50	0.57

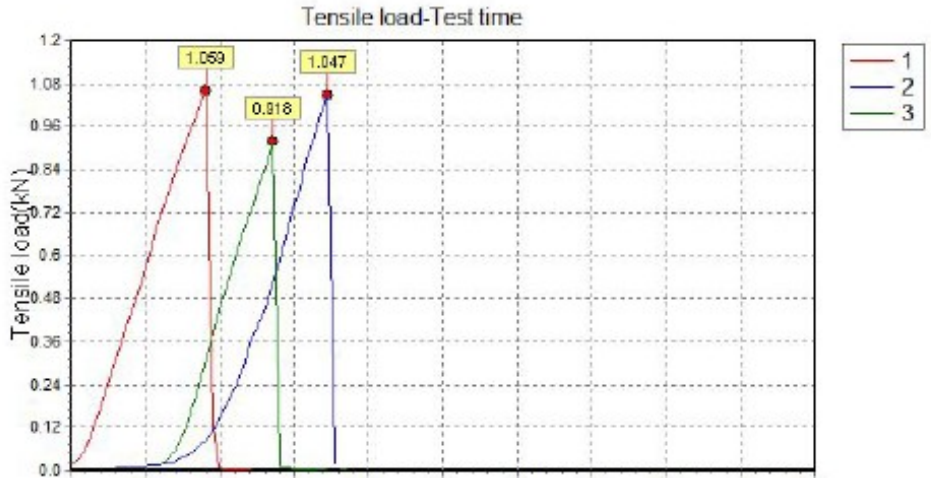


Figure 2. Bending resistance of waste samples from porcelain and ceramic production enterprises.

According to the results of the test, it was seen that the bending resistance of the samples taken from the wastes of the porcelain and ceramic products production enterprises are similar to the G-5, G-6 gypsum products used for construction, and their mechanical properties are similar.

On the basis of tests carried out on taking samples from waste and on the basis of gypsum production technologies, the main indicators of the technological regime of the process were determined, and the material balance of gypsum flows was drawn up in the enlarged industrial-experimental facility.

4 tables

Material balance of gypsum flows by production .

T/r	Work release processes	Amount in kg	Electric spending sq	Cost in sum
1	Grinding	1250	12	10,800
2	Sifting	1250	5	4,500
3	Heat up	1250	10	9,000
4	Jihoh and devices amortization	-	-	20,000

5	Additional expenses	-	-	10,000
6	Transportation costs	-	-	40,000
7	In the eye not caught expenses	-	-	5000
8	General amount of 25% of expenses	-	-	31 125
9	Received product yield 80%	1000	-	-
	Total	-	-	**130 425**

CONCLUSION

A secondary product in the production of gypsum binder from waste differs significantly from natural gypsum raw materials. Different availability requires additional processing: neutralization, enrichment and drying. Such processing increases the cost of gypsum. Compared to binders based on gypsum stone, it reduces competitiveness. Such materials can be competitive only in certain areas.

The results of the compiled material balance showed that the technology of obtaining gypsum based on the waste of enterprises is effective both economically and ecologically.

References

1. D.Qodirova, X.Nuriddinov. Bog„lovchi moddalar va qurilish materiallarini tadqiq etish usullari. (1-qism – “Bog’lovchi moddalar”) O’quv qo’llanma. Toshkent-2011y.

2. T.A.Otaqo‘ziyev, E.T.Otaqo‘ziyev. Gips, ohak ishlab chiqarish va gipsbeton, ohakbeton ishlari. –Toshkent. A.Qodiriy nomidagi xalq merosi nashriyoti. 2004.-248b.

3. [1]A.N. Xojimatov, [2]S.B.Mamajanov, [3]G‘.A Doliyev, [4]A.B.Abdulxayev, [5]D.SH.Ibrohimjonova, [6]M.M.O’lmasova Chinni va sopol buyumlari ishlab chiqarish korxonalari chiqindilaridan birlamchi xom ashyo olish texnologiyasi NamDU ilmiy axborotnomasi–2023-yil maxsus son.

4. GOST 23789-2018

5. GOST 125-2018