

Porosity properties and some properties of cement-concretes with complex modifiers

U.X. Abdullayev¹, S.I. Kandakharov¹, D.T. Sharipova¹, N.B. Rakhimova¹

¹Tashkent state transport university, Tashkent, Uzbekistan

Abstract: This article shows the methods of studying the porosity of cement stone modified by the combined effect of construction additives of various nature and hydration active mineral additives, as well as the production of products based on them.

Keywords: modifier, complex additives, cement-concrete, porosity, hydration active mineral additives.

Kompleks modifikatorli syement-betonlarining g'ovaklilik xossalari va ba'zi xususiyatlari

Abdullayev U.X.¹, Kandakharov S.I.¹, Sharipova D.T.¹, Rakhimova N.B.¹

¹Toshkent davlat transport universiteti, Toshkent, O'zbekiston

Annotatsiya: Ushbu maqolada turli xil tabiatdagi qurilish qo'shimchalari va gidratsion faol mineral qo'shimchalarning birgalikdagi ta'siri bilan o'zgartirilgan syement toshining g'ovakliligini o'rganish usullarini hamda ular asosidagi mahsulotlarni ishlab chiqarish ko'rsatilgan.

Keywords: Modifikator, kompleks qo'shimchalar, syement-beton, g'ovaklik, gidrasion faol mineral qo'shimchalar.

1. Kirish

Turli xil tabiatdagi qurilish qo'shimchalari va gidratsion faol mineral qo'shimchalarning birgalikdagi ta'siri bilan o'zgartirilgan syement toshining g'ovakliligini o'rganish alohida qiziqish uyg'otadi. Bu kombinatsiya gidratasiya jarayoniga ham ta'sir ko'rsatishga imkon beradi va gidratasiya mahsulotlari orasidagi nisbatning yo'naltirilgan o'zgarishiga hissa qo'shishi va syement toshining zichligini oshirishga sezilarli ta'sir ko'rsatadi.

Yeksperimental tadqiqotlarda Oxangaron syement zavodining M400 D0 markali portlandsyementidan foydalanilgan. Mineral to'ldiruvchi sifatida Yangi Angren IYeS dan uchuvchi kul (UK) va Toshkent quyuv-mexanika zavodining (TQMZ) po'lat eritish chiqindilari (PECH) ishlatilgan. Sirtli faol modda sifatida, polikarboksilat

superplastiklashtiruvchi (SP) POLIMIKS ishlatilgan.

Zamonaviy qurilishda yangi avlod betonlarining yuqori fizik-mexanik va ishlash xossalarini kuchaytirishda kimyoviy qo'shimchalardan qo'shib foydalanmasdan tasavvur qilish mumkin emas. Qurilishda bunday kompozitsiyalar va ular asosidagi mahsulotlarni ishlab chiqarish uchun reologik xususiyatlarga ta'sir qilish, strukturaning shakllanishi va havo kirish jarayonlarini nazorat qilish imkonini beradigan keng turdagi qo'shimchalar qo'llaniladi [1-6].

2. Tadqiqot metodikasi

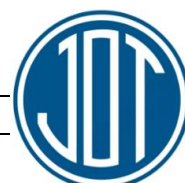
Tadqiqot o'tkazish uchun uchta turdagi kompozitsiyalarning bir qator namunalar tayyorlandi: nazorat va kompleks qo'shimchali (1-jadval).

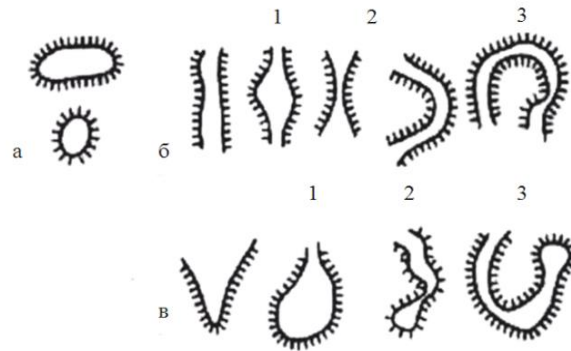
1-jadval

Beton qorishmasining o'rganilganlik tarkibi									
	Beton sinfi	Konus cho'kishi, sm	Syement, kg	Maydalangan tosh, kg fr. 5-20	Qum, kg M _{cr} =2,7	Suv, l	Zolo-unos, kg	Po'lat ishlab chiqarish chiqindilari, kg	Superplastifikator POLIMIKS, kg
	B15	1-2	236	1220	715	190	-	-	-
	B15	1-2	201	1220	792	133	35	-	1.89
	B15	1-2	201	1220	792	133	-	35	1.89

Shakliga ko'ra syement toshidagi g'ovaklar (1-rasm) yopiq (g'ovaklari yumaloq va boshqa g'ovaklardan

ajratilgan), kanal hosil qiluvchi (g'ovaklarning ikkala uchi ochiq va to'g'ri yoki chuvalchangsimon bo'lishi mumkin) turlarga bo'linadi [10-11].



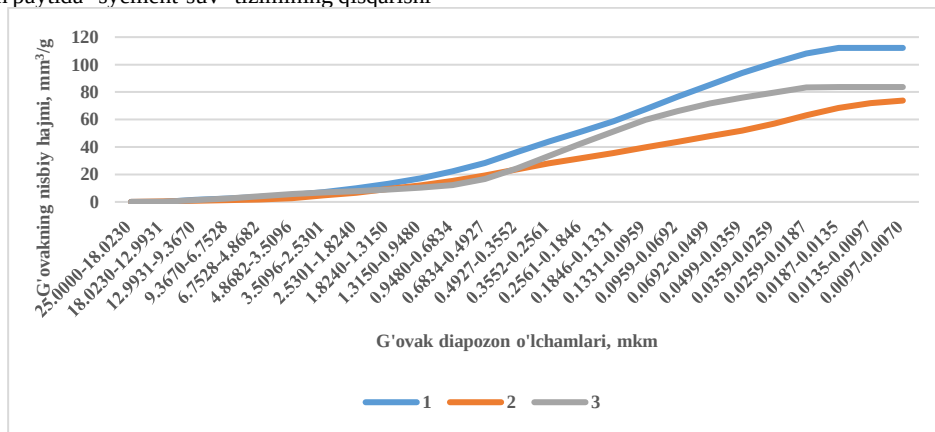


1-rasm. G'ovaklarning asosiy shakllari (A.S.Berkman va I.G.Melnikova bo'yicha):
a-yopiq yoki chegaralangan g'ovaklar; b-ochiq kanal hosil qiluvchi g'ovaklarlar;
v-berk g'ovaklar; 1-tekis; 2- qurtga o'xshash; 3- halqa shaklida

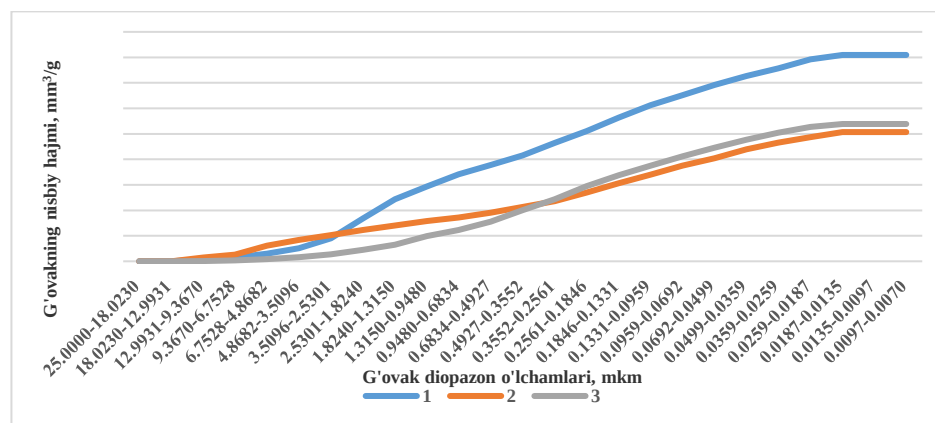
Kelib chiqishi bo'yicha syement toshidagi g'ovaklar havo, cho'kindi (kapillyar, cho'kindi) va qisqarish g'ovaklariga bo'linadi. Havo g'ovaklari texnologik omillar, suvning tashqi va ichki ajralishi natijasida cho'kish natijasida hosil bo'ladi. Siqilish g'ovaklari syement toshining qotish paytida "syement-suv" tizimining qisqarishi

tufayli hosil bo'ladi[1-7], qisqarish g'ovaklari kapillyarlarga xos o'lchamlarga ega degan taxmin mavjud.

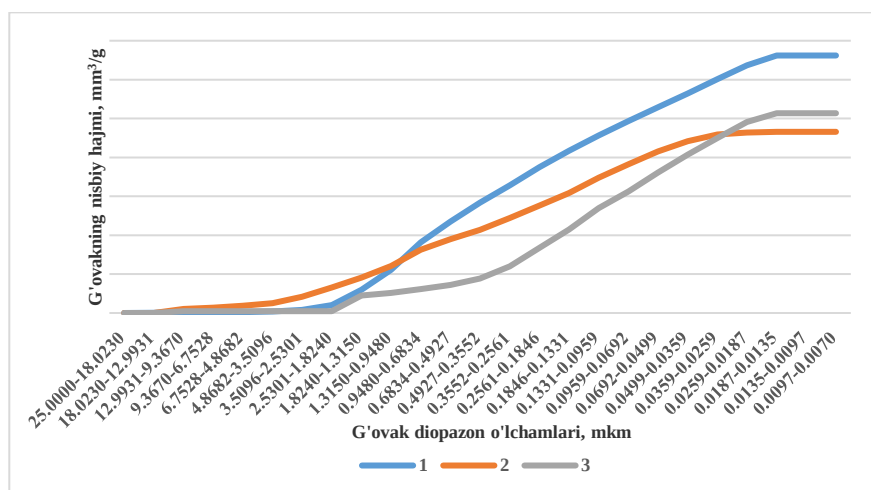
G'ovaklar parametrlarini o'rganish 2-4-rasmlarda ko'rsatilgan.



Rasm-2. 3 sutkali muddatda tadbiq qilinayotgan tarkib g'ovaklarining nisbiy hajmi:
1-nazorat; 2-ZU+SP; 3-SP+PECH



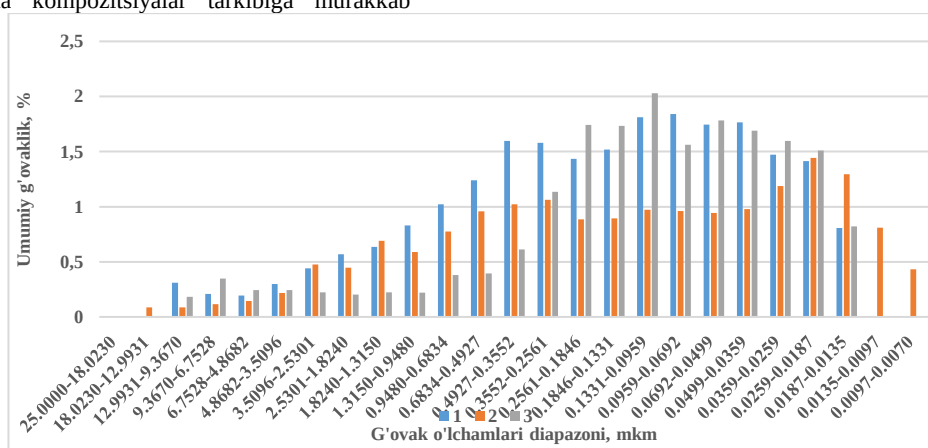
3-Rasm. 14 sutkali muddatda tadbiq qilinayotgan tarkib g'ovaklarining nisbiy hajmi:
1-nazorat; 2-ZU+SP; 3-SP+PECH



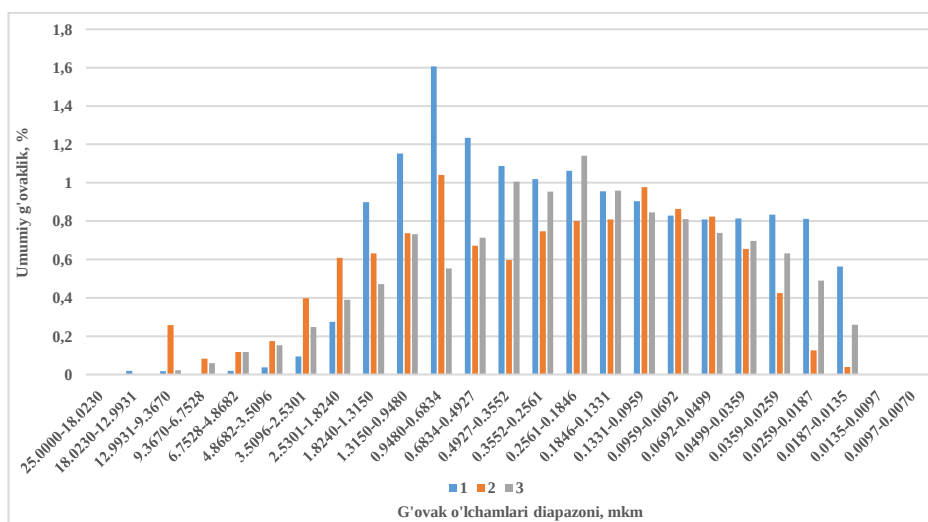
4-Rasm. 28 sutkali muddatda tadbiq qilinayotgan tarkib g'ovaklarining nisbiy hajmi: 1-nazorat; 2-ZU+SP; 3-SP+PECH

G'ovaklarning o'lchamlari bo'yicha taqsimlanishini tahlil qilish (5-7-rasm) mos yozuvlar tarkibi texnologik va kapillyar teshiklarning katta mavjudligi bilan klassik tuzilishga ega ekanligini ko'rsatdi. Integral g'ovaklikning o'xshash tabiatiga ega bo'lgan murakkab modifikatorli kompozitsiyalarda kompozitsiyalar tarkibiga murakkab

modifikatorni kiritish, nazorat namunaga nisbatan syement toshining umumiy g'ovakligining 15,23 % dan 26,41 % gacha pasayishiga olib keldi. Natijada gel g'ovaklar (0,007÷0,09 mkm), kapillyar (0,3÷10 mkm) va texnologik (≥10 mkm) g'ovaklarning muvozanati o'zgaradi.

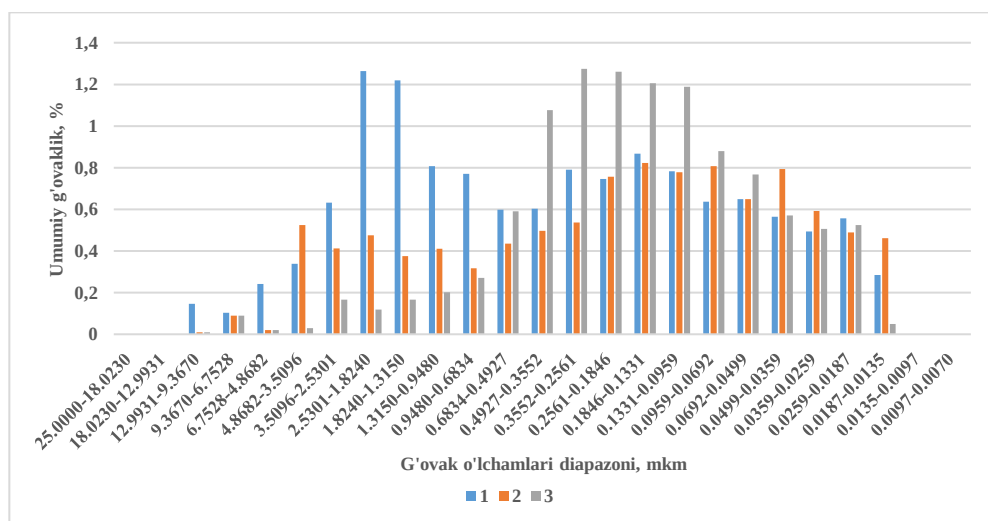


5-Rasm. 3 sutkali muddatda tadbiq qilinayotgan tarkib o'lchamlarining umumiy g'ovakligi: 1-nazorat; 2-ZU+SP; 3-SP+PECH



6-Rasm. sutkali muddatda tadbiq qilinayotgan tarkib o'lchamlarining umumiy g'ovakligi: 1-nazorat; 2-ZU+SP; 3-SP+PECH





7-Rasm. 28 sutkali muddatda tadbiq qilinayotgan tarkib o'lchamlarining umumiy g'ovakligi: 1-nazorat; 2-ZU+SP; 3-SP+PECH

3. Xulosa

Tadqiqot natijasida olingan natijalar SP+ZU va SP+PECH asosidagi tarkiblarning kompozit betonning talab etilgan xususiyatlariga yaxshi ta'sir o'tkazdi va natijalar gidratatsiya jarayonini borishida chuqur ahamiyat kasb etdi.

Foydalanilgan adabiyotlar / References

- [1] Adilkhodzhaev A. I., Kadirov I. A., Abdullaev U. X. Influence of polycarboxylate superplasticizer and binary filler on rheological properties of concrete mixtures // Railway transport: topical issues and innovations, 2023 №2. -129-135
- [2] Adilkhodzhaev A. I., Kadirov I. A., Abdullaev U. X. Effect of binary microfiller on structure formation processes of cement binder // Railway transport: topical issues and innovations, 2023 №2. -202-210
- [3] Adilkhodzhaev A. I., Kadirov I. A., Abdullaev U. X. About the properties of a modified cement binder based on a binary microwave // Railway transport: topical issues and innovations, 2023 №2. -112-118
- [4] Adilkhodzhaev A. I. et al. Features of continuous units forming of reinforced concrete products // "Online-conferences" platform. – 2021. – S. 1-4.
- [5] M. Schmidt. Jahre Entwicklung bei Zement, Zusatzmittel und Beton. Ceitzum Baustoffe und Materialprüfung. Schriftenreihe Baustoffe. // Fest-schrift zum 60. Geburtstag von Prof. Dr.-Ing. Peter Schiesse. Heft 2. 2003, s. 189-198.
- [6] Adilkhodzhaev A. I., Kadyrov I. A., Umarov K. S. About the influence of a zeolite containing filler (natrolite) on the properties of cement binder // Journal of Tashkent Institute of Railway Engineers. – 2020. – T. 16. – №. 2. – S. 20-27.
- [7] S. Donatello, M. Tyrer, C. Cheeseman. Comparison of test methods to assess pozzolanic activity. Cement Concrete Comp. 2010;32:121–7.

[8] [Adilkhodzhaev, A., Kadyrov, I., Rasulmukhamedov, A.](#) Research of porosity of a cement stone with a zeolite containing filler and a superplasticificator E3S Web of Conferences, 2021, 264, 02007

[9] Adilkhodzhaev A. I., Kadyrov I. A., Umarov K. S. Research of porosity of a cement stone with a zeolite containing filler and a superplasticificator // Journal of Tashkent Institute of Railway Engineers. – 2020. – T. 16. – №. 3. – S. 15-22.

[10] Adilkhodzhaev A. I. et al. To the Question of the Influence of the Intensity of Active Centers on the Surface of Mineral Fillers on the Properties of Fine-Grained Concrete // International Journal of Innovative Technology and Exploring Engineering (IJITEE). – 2019. – T. 8. – №. 982. – S. 219-222.

[11] Adilkhodzhaev A. I., Umarov K. S., Kadyrov I. A. Some features of the rheological properties of cement pastes with zeolite-containing fillers // International Engineering Research and Development Journal, 5 (CONGRESS). – 2020. – S. 4-4.

[12] Adilkhodzhaev A. I., Kadirov I. A., Abdullaev U. K. Some issues of moisture transfer in concrete. – 2021.

[13] Ishanovich A. A., Abdullaevich K. I. Technical and economic comparison of the efficiency of production of empty plates of overlapping of underworking forming when reinforced with wire and ropes. – 2021.

[14] Adilkhodzhaev A. I., Kadirov I. A. On the mechanoactivation of metallurgical waste. – 2021.

Mualliflar haqida ma'lumot / Information about the authors

Abdullayev
Ulug'bek
Hakimovich

Toshkent davlat transport universiteti
"BSIQ" kafedrası katta o'qituvchisi,
texnika fanlari bo'yicha falsafa doktori
(PhD); telefon: +998-71-299-03-02,
e-pochta: uabdullayev@mail.ru

Kandaxarov
Sanjar
Ishratovich

Toshkent davlat transport universiteti
"BSIQ" kafedrası dotsenti, texnika
fanlari bo'yicha falsafa doktori (PhD);
telefon: +998-71-299-03-02,
e-pochta: sanjar.kandaxarov@mail.ru



Sharipova
Dilafruz
Tofukovna

Toshkent davlat transport universiteti
“BSIQ” kafedrası dotsenti v.b., texnika
fanlari bo‘yicha falsafa doktori (PhD);
telefon: +998-71-299-03-02, elektron
pochta: Dsharipova@mail.ru

Rahimova
Nozima
Baxtiyarovna

Toshkent davlat transport universiteti
“BSIQ” kafedrası katta o‘qituvchisi,
texnika fanlari bo‘yicha falsafa doktori
(PhD); telefon: +998-71-299-03-02,
e-pochta: [Nrakhimova@mail.ru](mailto:Nrahimova@mail.ru)

