ЗАЩИТА ОТ УВЛАЖНЕНИЕ ВОДЯНЫМ ПАРОМ В ВОЗДУХЕ ПРИ ХРАНЕНИИ ЦЕМЕНТА

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Аннотация: *В статье предусмаривалось, сорбционное увлажнение цементов при транспортировке и хранении приводит к потери их активности и значительным недоборам прочности растворов и бетонов на лежалых цементах.*

Ключевые слова: *цемент, бетон, сорбционное , увлажнение, транспортировке, растворов и бетонов*

PROTECTION AGAINST HUMIDIFICATION BY WATER VAPOR IN THE AIR DURING CEMENT STORAGE

Annotation: *The article stipulated that sorption moistening of cements during transportation and storage leads to a loss of their activity and significant shortfalls in the strength of mortars and concretes on aged cements.*

Key words: *cement, concrete, sorption, humidification, transportation, mortars and concretes.*

Sorptive moistening of cements during transportation and storage leads to a loss of their activity and significant shortfalls in the strength of mortars and concretes on aged cements. Molecular adsorption hydrophobic films on the surface of cement particles significantly reduce the amount of sorption moisture, thereby increasing the safety of cements.

The study of sorption humidification was carried out at a relative humidity of 95-100%. Cements were stored on special baking sheets, as well as in waxed paper glasses. After each determination, the cements in the container were shoveled. Table 1. shows the results of sorption moistening of cements stored on open trays.

As follows from the data presented, the most intensive moistening of cements occurs in the first ten days. During this period, the control cement gained more than 50% moisture compared to 160 days of storage. By ten days, the moisture content of cements with oxidized petrolatum in the still cleaning was 5 times less, and with soap naphtha, 8 times less than in the control. The same ratio changed slightly after 160 days of storage.

Table 1

Type of additive	Dosage ,%	Change in weight of cements x/through						
		3 day	7 day	10 days	30 days	40 days	50 days	160 days
No additive	-	0,8 100	1,98 100	8,1 100	11,4 100	12,7 100	13,2 100	15,7 100
OP	0,22	0,21 26	0,52 26	1,66 21	2,0 17	2,4 19	2,6 20	3,54 23
MN	0,2	0,1 12	0,3 15	1,01 12	13,7 12	1,8 14	2,2 16	3,4 22
VAT residues	0,22	0,15 19	0,45 22	1,6 20	1,82 16	2,45 19	2,55 19	5,9 38

x/ above the line -% weight gain, below the line - relative change in weight compared to the control sample.

Table 2

No additive	Additive dosage in %			
	0	0,05	0,10	0,20
Roudcement				
C_7- C_9	5,26 100	0,61 12	0,37 7	0,45 9
C_{10}- C_{16}	5,26 100	2,66 51	0,62 12	0,38 8
C_{17}- C_{20}	5,26 100	3,25 62	1,98 38	0,38 7
ALITIC CEMENT				
C_{10}- C_{16}	2,28 100	1,35 59	0,28 11	0,15 7
C_{17}- C_{20}	2,28 100	1,13 50	0,33 14	0,12 5

Note: above the line - absolute % of sorption moisture below the line -% in relation to control cements.

Conclusion: Thus, all hydrophobizing surfactant additives used in the work significantly reduce the sorption moisture of cements and increase their safety.

HEAT GENERATION

Changing the amount of heat released during cement hydration can be done by directly determining the amount of heat released during cement hardening, or by an indirect method, calculating the heat of hydration from the difference in the heat of dissolution of unhydrated cement in the same solvent.

To determine the heat release, the thermal method was used. It is the most common and standardized by the current GOST for hydraulic concrete. The essence of this method is to determine the heat released during cement hydration by measuring the temperature of the cement-sand mortar

hardening in a thermos. The composition of the latter is selected in such a way that the increase in temperature of the cement mortar is within the limits 10-150.

The tested cement was mixed with normal sand in weight

$$\frac{\text{IN}}{\text{C}}$$

ratio 1:1.5 (cement-sand) at ------- = 0.35.

Quantity of materials per batch: cement (d) -105 g,
sand -158 g, water -37cm^3

Ther mo rooms owls	Characteristics of thermoses	Characte ristics of cements	Continued live tests tania, hour	Temper cement solution start end 0C	Higher temperatur e change cement solution for specified periods of time (thx-to), 0C
1	2	3	4	5	6
И	Thermal value of a thermos C = 65.06 cal/degree. Thermos heat transfer constant: Kk= 14 cal/deg. Thermal value of thermos with cement mortar: Average = 154.7 cal/deg.	Clinker cement C=2800 cm2/g	0 2 24 33 48 72 120 168	18 20 26,2 25 23,97 22,6 21,6 20,45	- - 8,2 7,0 5,97 4,6 3,6 2,45
ИИ	The thermal value of the thermos is 53.4 cal/deg. Heat transfer constant of a thermos: Kk = 15.2 cal/deg. Thermal value of a thermos with cement mortar: Average = 143 cal/deg.	Cement with 10% active mineral additive C=2800 cm2/g	0 1 24 33 48 72 120 168	18,3 20 25,7 24,6 23,75 22,43 21,15 20,5	- - 7,4 6,3 5,45 4,13 3,2 2,2

ИИИ	Thermal value of a thermos C=57.7 cal/deg. Thermos heat transfer constant: Kk = 14.3 cal/deg. Thermal value of a thermos with cement mortar: Average=147.3 cal/deg	Cement with 10% active mineral additive, 0.2% OP and 1% SSB C=2800 cm2/g	0 2 24 33 48 72 120 168	18,5 20 25,7 24,3 23,9 22,5 21,7 20,7	- - 7,2 5,8 5,4 4,0 3,2 2,2
Continuation of table 3					
	7	8	9	10	11
	Heat, accumulated lenya in ter Moses for the data periods of time K_1= Cp=(τx-τ), 0C cal. - - 1260 1080 922 704 556 379	Φ=Φ1+Φ2+…Φн deg/hour - - 190 222 286 329 383 412	Warmth, lost thermoses for given periods of time K_2= Kк=* Fi Feces - - 2660 3110 4008 4606 5360 5761	The total amount of heat released during given periods of time K_3= K_1+ K_2 feces - - 39920 4090 4930 5310 5916 6140	Heat of cement hydration released during given periods of time by 1 kg of cement K к = ----- к cal/g - - 37.4 39,0 47.0 50,6 56,3 58,5
	- - 1650 858 785 595 471 318	- - 132 194 255 292 392 364	- - 1890 2770 3655 4180 4890 5202	- - 3540 3623 4440 4775 5361 5520	- - 33,7 34,5 42,3 45,5 51,0 52,6

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