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STUDYING THE POSSIBILITIES OF CONTINUOUS PRODUCTION OF REINFORCED CONCRETE STRUCTURES DURING THE YEAR

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ABSTARCT

The kinetics of metered consumption of additional energy, depending on the start of the combined geliotermtilling during the day and the season stacking. For Bukhara region set actual flow more electrical energy needed to ensure year-round operation geliopoligonov equipped with flat reflectors.

Keywords: geliopoligon, gelioform, geliostend, the standard mod, geliotermictreafment, radiation, temperature keeping.

Thermal treatment technology (SVITAP) in light-transmitting film-covered helioforms for reinforced concrete structures 5-6 months of the year provides the production of concrete and reinforced concrete products by providing daily rotation of the formwork [1,2]. It is very important to determine the daily dosed consumption of conventional energy used to make up for the lack of solar energy needed to ensure the uninterrupted operation of helipoligons throughout the year.

The research was conducted on the basis of the method developed in the NIIJB [3]. Based on it, the study created a heating regime close to summer conditions that provides 50% RRm.q28 stability and daily replacement of the mold for 22 hours by dosing conventional energy. Electricity was used as additional energy to facilitate the recording of conventional energy consumption.Experimental studies were performed on laboratory heliostands consisting of four wall-boards and a base that protected the internal volume from heat loss from the external environment (Figure 1). Two heliostands (one equipped with a flat-surface reflector) were equipped with an electrode connected to a 220V AC with a laboratory transformer. Electricity consumption was recorded with a meter SO-I 446. In the study, the ratio of components was 1: 2.3: 3.77, S / Ts = 0.59, mobility of heavy concrete grade 200 with O.K. = 1-4 cm. used. A 40x40x15 cm specimen and a standard 10x10x10 cm cubic specimen were placed inside each heliostend, which equally characterized the solidification conditions of the concrete in real objects. The heating of the concrete inside the heliostands was measured using an automatic potentiometer KSP-4 and XK-thermocouples. The strength of concrete in standard samples was determined in accordance with GOST 10180-2012. The intensity of solar radiation was measured by an albedometer connected to a portable galvanometer.

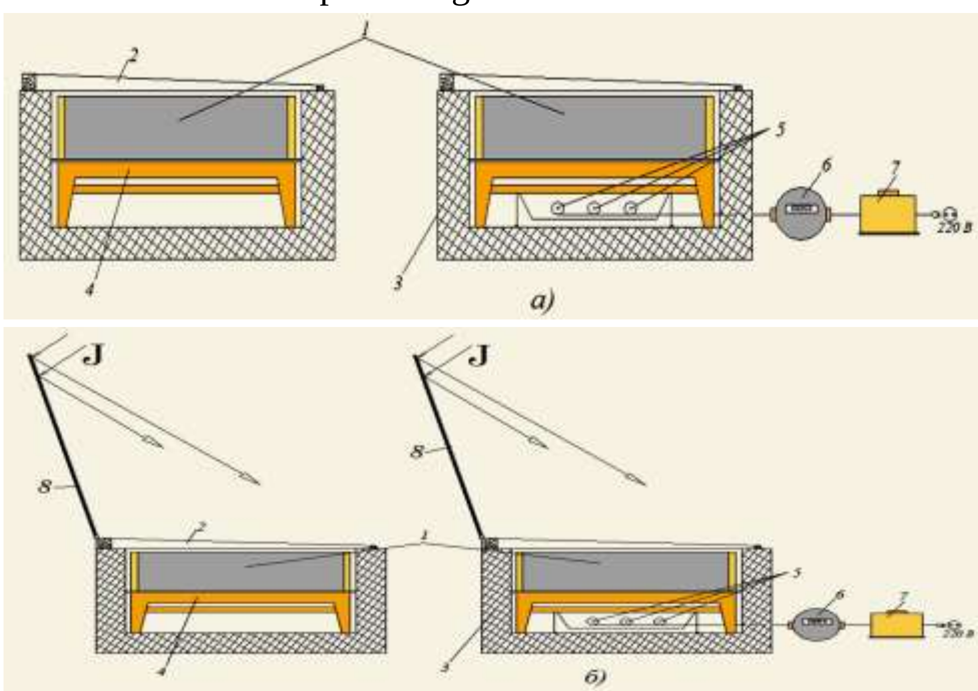


Figure 1. Schematic diagram of laboratory solar stands

1- concrete sample characterizing real objects; 2- light-transmitting, heat-shielding cover; 3 heat-protected wall heliostend; 4-metal table; 5 - electricity; 6 electricity consumption meter; 7-transformer, 8-flat surface light reflector.

Experimental studies on thermal treatment of concrete using a mixture of solar and conventional energy sources were conducted in different months of the winter season, and the start time of heliothermal treatment of concrete was set at 10.00 am.

The results of the studies are presented in Table 1 and in the form of graphs in Figure 2. The analysis of the results shows that the solar radiation reaches its maximum value of 400 W / m2 • ch, enough to heat the concrete to a maximum temperature of 300S without the use of additional energy. This, in turn, does not ensure that the concrete achieves 50% R28 strength at a daily age. By dosing and compensating for the lack of energy, the concrete was heated to a temperature of 62-68 0C and slowly cooled to a temperature of 28-310C until the next morning. The fact that the concrete samples inside the heliostend reached a strength of 50-60% Rm.q28 testifies to the fact that a heating regime close to the standard was created under laboratory conditions due to the additional electrical energy transmitted. Such a standard heating mode was also set up in a heliostand equipped with a flat-surface reflector powered by electricity. As a result, it was observed that heliostands equipped with flat-surface reflectors consume 30-50% less additional electricity than heliostands without reflectors.

The table shows the additional energy consumption for the volume of hardening concrete and metal elements located inside the laboratory heliostand. To analyze the results, the energy consumption was recalculated for 1 m3 of concrete and plotted accordingly (Figure 3). Table 1

Additional energy consumption in thermal treatment of concrete using a mixture of solar and conventional energy sources during the winter

Molding time	**Total solar radiation intensity during the day, W / m2**		**Additional energy consumption per day, Q (kWh)**		**Temperature capacity of a one-day-old sample, S, (grad.hours)**				**Rsiq, MPa of one day old concrete**		**Rmq 28, MPa**
					Without reflector		**Without reflector**		**Without reflector**	**Without reflector**	
	Without reflector	**Without reflector**	**Without reflector**	**Without reflector**	**40x40x 15 sм**	**10x10x10 sм**	**40x40x15 sм**	**10x10x10 sм**			
1	2	3	4	5	6	7	8	9	10	11	12
November 2 decade	2216	3886	2.206	1.413	980	986	1010	1016	12,9 /59,1	13,0 /59,6	21,8
December 1 decade	1892	3594	2,518	1.736	1020	990	1034	1022	13,25/60	13,8 /62.2	22,1
December 3 decades	1123	2088	3.456	2.468	977	984	1006	996	11,8 /56,5	11.66/56	20,9
January- 1 decade	928	1707	3,945	3.13	969	1076	973	1098	11,75/50	11,9 /51.0	23,3
January- 3 decade	1271	2287	3,83	2.77	945	1064	962	1076	11,0/50,2	11,2 /51.1	21,9
February 1 decade	2975	4588	2,41	1.697	957	964	969	970	12,6/57,8	12,8 /58.7	21,8
February 3 decade	3832	5571	2,29	1.53	938	1005	957	1040	11,4/51,1	11,5 /51,5	22,3
March- 1 decade	4013	5678	1,31	0,84	970	1009	990	1010	11,75/55	11,7/55,3	21,2

Note: In columns 10,11,% is obtained in relation to Rmq28.

As can be seen from Figure 3, while solar radiation provides a sufficiently significant portion of the energy (122 kWh / m3) sut.) Required for full thermal treatment of 1 m3 of concrete during the winter, darkened sections of the graph). For the period from December to mid-March in the Bukhara region, this value is 29.6% for a heliostend without a reflector (Fig. 3, a) and 38.5% for a heliostend equipped with a reflector (Fig. 3, b).

This graph argues that it is beneficial to use solar radiation even at its low intensity, noting that in hot arid climates there are opportunities to save conventional fuel energy resources used for thermal treatment of concrete structures not only in winter but also in spring and autumn. The application of KGTO in gelipoligons equipped with flat light reflectors in the same winter season allows to save 40-45% of traditional energy production compared to traditional heat treatment methods.

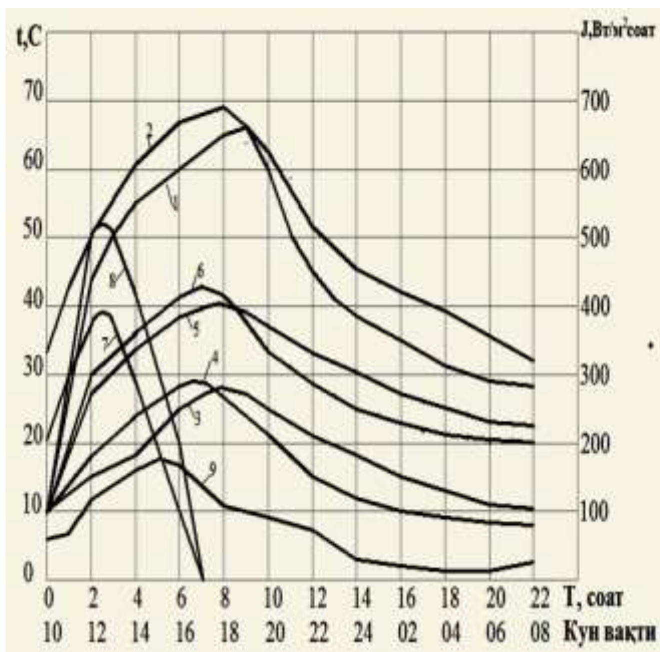
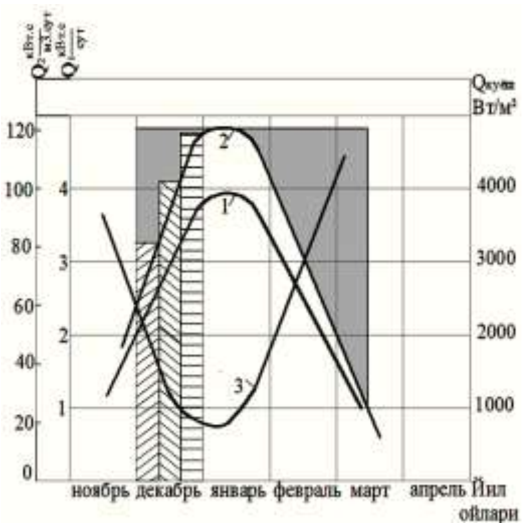
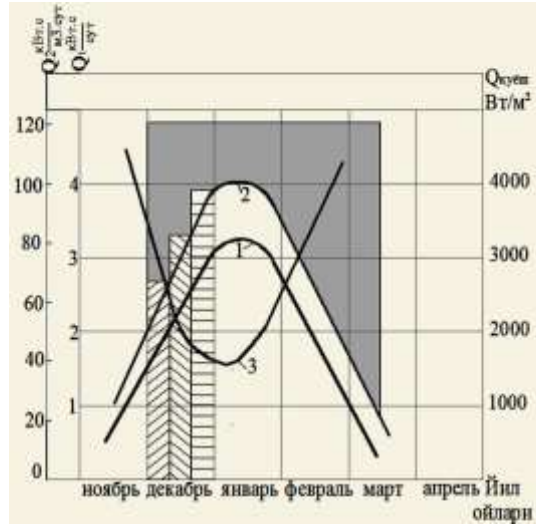


Figure 2. Heating of concrete samples using a mixture of solar and conventional energy sources on a laboratory heliostand

1, 3, 5 - at a depth of 75 mm from the surface of the concrete sample, which characterizes the real objects; 2, 4, 6 - at a depth of 50 mm from the surface of the standard sample; 1, 2 - heating under the reference regime using a mixture of solar and conventional energy sources; 3, 4 - under conditions where no additional energy is transmitted; 5, 6 - similarly, in a heliostand equipped with a flat-surface reflector; 7 intensity of solar radiation; 8- under a similar flat-surface reflector; 9 ambient temperature.



а)



б)

Figure 3. Additional energy consumption for heliothermal treatment of concrete in the winter using a mixture of solar and electricity for the Bukhara region.

for a-reflector heliostend; b-flat surface for light-reflecting heliostend; 1 Additional energy consumption calculated for laboratory heliostand; 2 for the same 1 m3 of concrete; The cumulative intensity of solar radiation for 3 days.

It is possible to determine the energy demand of the designed heliopoligons in the Bukhara region using a graph that determines the additional energy consumption in heliothermal treatment of concrete (1m3) using a mixture of solar and electricity. The analysis shows that in the first ten days of December, 1 m3 of concrete and reinforced concrete requires 79 kWh / day, in the second ten days -105 kWh / day, in the third ten days -118 kWh / day of electricity. In gelipoligons equipped with flat-surface reflectors, these figures are 54 kWh / day, -72 kWh / day in the second decade and -88 kWh / day in the third decade, respectively. Similarly, additional electricity consumption can also be determined for 3 days or 5 days, for January and February

Special studies were conducted to determine the additional energy consumption relative to the start time of the KGTO during the day. The graph of the change in additional energy consumption relative to the start time of the KGTO during the day is shown in Figure 4. At the same time, the change in additional energy consumption was determined as a percentage of the KGTO starting position at 1000 h.

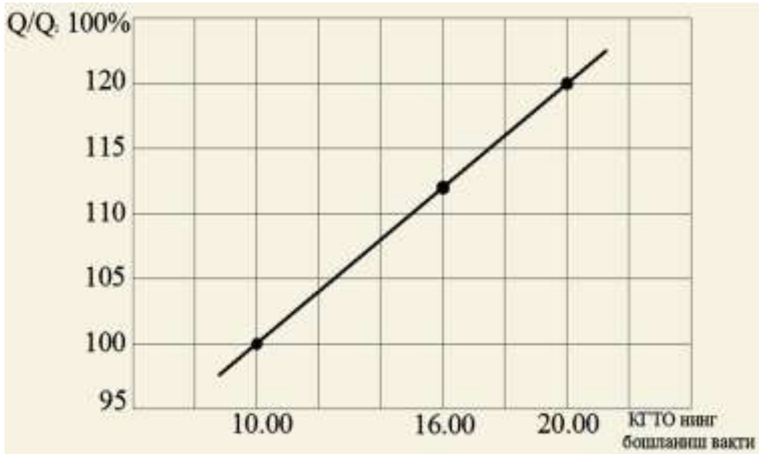


Figure 4. The change in additional energy consumption for different start times of KGTO during the day relative to the demand for additional energy in the KGTO starting position at 1000.

Determining the demand for additional energy of solar power plants equipped and not equipped with reflectors for any season, month and day of the year, taking into account the exact values of electricity consumption in KGTO (Figure 3) and its percentage increase depending on the start time of heliothermal processing (Figure 4) possible.

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