

**Analysis of consumption of electric power the reclamative pumping stations in
the Republic of Uzbekistan**
Hidirov A.¹, Mamasharifov M.² (Republic of Uzbekistan)
Анализ потребления электроэнергии мелиоративными насосными станциями
Республики Узбекистан
Хидиров А. А.¹, Мамашарифов М. А.² (Республика Узбекистан)

¹Хидиров Абдумалик Абдувохидович / Hidirov Abdumalik – преподаватель;

²Мамашарифов Мансур Алижонович / Matasharifov Mansur – студент,

кафедра гидравлики и гидроэнергетики,

Ташкентский государственный технический университет им. Абу Райхана Беруни,

г. Ташкент, Республика Узбекистан

Abstract: in this article questions of energy consumption by pump stations of the Republic of Uzbekistan are considered and it is given general information about the operated pump stations and electric motors.

Аннотация: в данной статье рассмотрены вопросы энергопотребления насосными станциями Республики Узбекистан, и даются общие сведения об эксплуатации насосных станций и электрических двигателей.

Keywords: pump stations, electric motors, melioration, electric power, power, machine irrigation, area, pressure head pipeline, consumption, energy losses.

Ключевые слова: насосные станции, электрические двигатели, мелиорация, электроэнергия, мощность, машинное орошение, площадь, напорный трубопровод, потребление, потери энергии.

If to examine machine irrigation on the whole, then on results our researches it is possible to do next conclusion, weighted average set power of pumps, on 1 ha of machine irrigation in Republic there are 2,1 thousands kW. And in the areas of the Fergana.

Table 1. Weighted average set power of pumps

Regions	Watering squared of earth	Using pumping stations	Common voltage of pumping station, kVt	1gr square for watering using voltage of pumping, kVt
Andijan	76,9	143	306,7	3,99
Bukhara	583	30	575,2	0,99
Jizzakh	122,52	29	191,14	1,56
Kashkadarya	565,1	62	670,3	1,8
Navoiy	89,1	32	95,3	1,07
Namangan	164,85	218	562,3	3,41
Samarkand	61,32	88	141,63	2,31
Surkhandarya	262,2	118	642,5	2,45
Sirdarya	119,02	45	69,3	0,85
Tashkent	44,37	133	110,7	2,50
Fergana	126,5	147	268	2,12
Khorezm	68,2	285	70,34	1,03
Karakalpakstan	132,1	273	97,73	0,74
Common on country	2415	1602	3804,2	1,58

Analysis of the modes, undertaken studies, showed exploitations of the pumping stations and cascades of the pumping stations, that the basic consumers of electric power are the large reclamative pumping stations, but to their number it is necessary to take the pumping stations with long pressure pipelines. Appearance and all greater distribution of such pumping stations are related to that mastering of new arrays is attended not only with getting up of water on command marks but also moving of her, on considerable distances from a water source [1].

In a table 2 dependences of change of middle length of one thread of pressure pipeline are presented for the different periods of development of machine irrigation in Republic of Uzbekistan. by pressure pipelines. Appearance and all greater distribution of such pumping stations are related to that mastering of new arrays is attended not only with getting up of water on command marks but also moving of her, on considerable distances from a water source.

Table 2. Dependences of change of middle length of one thread of pressure pipeline

Years	1965	1975	1985	1995	2005	2015
Pressure tubing large of pumping station, m	1100	1800	2400	2600	2780	2950

As be obvious from a table, in the last few years the size of middle length of one thread of pressure pipeline grew almost in 2,53 time, making 2780 meters. And this process will proceed, with development of machine irrigation in Republic. Most lengths of pressure pipelines are marked in the areas of the Fergana valley. For example, from 48 the most large pumping stations of the Namangan area - 20 stations have pressure pipelines long 2,3 kilometres, on 6 stations length arrives at are 7 kilometres, and on 4 pumping stations - exceeds a 10 km the Analogical indexes are observed in Bukhara, Kashkadarya and row of other areas. The increase of length of pressure pipelines resulted in growth of losses of energy in them on overcoming forces of hydraulic friction. Analysis of actual exploitation of the pumping stations, showed that correlation of losses of electric power is in pressure pipelines, pumps and electric motors, accordingly make:

- pressure pipelines are 956 millions kW/h;
- pumps are 779 millions kW/h;
- electric motors are 308 millions kW/h.

In a table 3. the results of calculations of losses of electric power are presented in the regional managements of the pumping stations [2].

Table 3. . The results of calculations of losses of electric power

Departure of pumping station	Energy consumption of pumping station kVt.h	Common losing of energy mln. kVt.h					
		$\Sigma \Delta \dot{Y}$	Notes				
			$\Delta \dot{Y}$	$\Delta \dot{Y}_m$	$\Delta \dot{Y}_p$	$\Delta \dot{Y}_{pl}$	$\Delta \dot{Y}_{em}$
Karakalpakstan	49,9	16,13	1,01	3,53	7,47	3,95	0,20
Andijan	452,3	206,53	12,26	17,60	72,22	101,23	3,23
Bukhara	186,6	76,18	5,03	11,15	29,46	29,86	0,69
Jizzakh	9,3	3,80	0,24	0,63	1,46	1,42	0,05
Kashkadarya	80,6	40,53	2,49	2,17	10,10	25,22	0,55
Navoiy	134,6	56,50	3,19	6,75	14,13	31,39	1,04
Namangan	975,6	420,72	25,87	31,50	147,2	210,47	5,68
Samarkand	142,3	62,28	3,93	7,20	16,26	34,14	0,74
Sirdarya	98,9	30,30	1,91	7,74	14,30	5,99	0,36
Surkhandarya	883,6	302,34	17,69	40,83	135,9	102,59	4,98
Tashkent	89,2	31,08	1,85	4,57	11,51	12,67	0,48
Fergana	353,1	166,53	10,24	12,43	58,33	83,27	2,25
Khorezm	48,9	17,22	0,97	3,88	6,87	5,29	0,32
Amu-Bukhara Magistral river energy departure	1592,5	673,00	38,13	36,89	242,7	309,68	9,64
Karshi Magistral energy departure	2390,2	848,69	49,67	167,9	338,0	279,12	13,99
Mirzacho'l energy departure	257,6	108,09	6,23	11,72	32,09	56,17	1,88
Republic of Uzbekistan	7745,2	3023,9	180,7	366,5	1137,95	1292,7	46,07

$\Sigma \Delta \dot{Y}$ - common energy

$\Delta \dot{Y}_m$ - mechanic motor consumption energy

$\Delta \dot{Y}_p$ - pumping consumption energy

$\Delta \dot{Y}_{pl}$ - pipeline consumption energy

$\Delta \dot{Y}_{em}$ - exe mechanic consumption energy

Increase of length of pressure pipelines of the pumping stations, conduces not only to the increase of losses of electric power, at water lifton command marks but also puts additional difficulties into the operation of these objects. It is first of all constrained, with possible transients on the pumping stations. Normal technological transients are plugged in itself - starting, stop, switching etc., these processes during correct exploitation do not

entail emergency situations. But force, transitional processes caused, for example in the process of work can disconnecting of electric power entail large troubles, by creation of emergency situations. For example, water-hammer in a pressure pipeline.

References

1. *Muxammadiev M. M., Urishev B. U.* «Hydropower equipment». Textbooks. - Tashkent: «Science and Technology», 2013. 150 p.
2. *Mamajonov M.* «Pumps and pumping stations». Textbook. – Tashkent: «Science and Technology», 2013. 167 p.