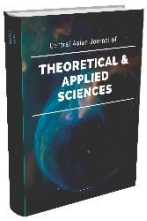


CENTRAL ASIAN JOURNAL OF THEORETICAL AND APPLIED SCIENCES

Volume: 04 Issue: 12 | Dec 2023 ISSN: 2660-5317
https://cajotas.centralasianstudies.org

Calculation of Sand Areas and Bunker of Wastewater Treatment Institutions

Orzimatov Johongir, Xakimov Mirkomil
Farg‘ona politexnika instituti

Received 4th Oct 2023, Accepted 6th Nov 2023, Online 27th Dec 2023

Abstract: *The sand trapped in the sander at the wastewater treatment plant is removed using hydraulic elevators, and then the sand is removed by sandblasters (pulpers) to specially prepared sand fields. The sand area is a carded area surrounded by 1-2 m high earthen walls (valleys). The size of the area, the layer of dumped sand is taken at the rate of 3 m3/m2 per year, and dried sand is removed from time to time.*

Keywords: *Sandfield, bunkers, waste water, treatment facilities, sand washing, efficiency improvement, building codes and regulations.*

Introduction.

According to the Decree of the President of the Republic of Uzbekistan No. PF-60 dated 28.01.2022, one of the following tasks in the development strategy of New Uzbekistan for 2022-2026 is "Implementation of the state program of fundamental reform of water conservation and water resource management systems". ways to reduce electricity consumption in water management facilities" are shown. The implementation of these tasks, including the improvement of the automatic control and management of the parameters of the technological environment aimed at automating the technological processes of treatment plants based on intelligent systems, ensuring the optimal modes of operation of the main equipment in the conditions of changing the important characteristics and technological parameters, are considered the main tasks.

Domestic-economic, industrial and atmospheric water is produced in residential areas. Discharge of liquid waste generated in these areas through pipes and canals in the form of hydrotransport is convenient and cheap from a technical, economic and sanitary point of view. This type of wastewater is saturated with various pollutants and has different properties and quality indicators. The reuse of wastewater through the practice of discharging, pumping, receiving, cleaning and adding to open basins allows saving water resources in our region.

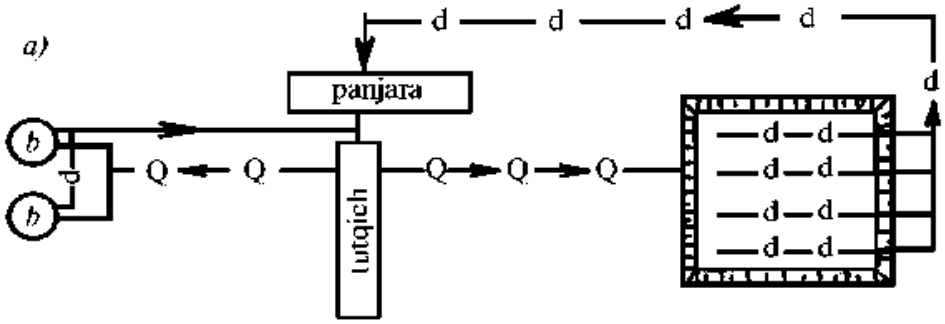
In the wastewater treatment plant, sand traps are used to retain minerals (sand, glass, soil, slag, metal particles, powders, salts, acids, alkalis) contained in the wastewater. Non-use of septic tanks can have a negative impact on the quality of technological processes due to the presence of rapidly settling minerals in the wastewater, which can sink to the bottom of the network and facilities. When the waste water consumption is more than 100 m3, it is sent to the received sand fields.

For sand drying in sand fields, platforms with a floor height of 1-2 m are used, separating the fields from each other. Such sand fields are calculated according to paragraph 6.23 of QMQ 2.04.02-97.

The total surface area of sand fields is determined as follows:

$$F = \frac{(Wday * 365)}{x}, \text{ m}^2 \qquad (1)$$

here: *x*- annual sand thickness, Wday- annual sand thickness. According to QMQ 2.04.02-97, it is considered that no more than 3 cubic meters per 1 square meter of land are spilled in a year (taking into account the fact that dry sand is periodically transported from the site during the year).

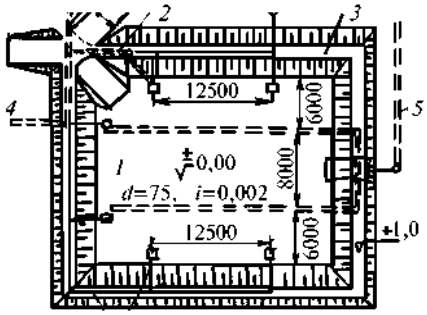


1- picture. Diagram of mutual location of sand traps, bunkers, platforms and communications between them.

The surface area of one sandbox is determined by the following formula.

$$f = \frac{F}{n}, \text{ m}^2 \qquad (2)$$

n- number of bunkers, n is equal to at least 2. The volume of each bunker should be at least 20 cubic meters.



2- picture . Sand field.

1 - sand area; 2 - barrier; 3 - sand distributor tarnov; 4 - sand coming pipe, 5 - drainage.

According to the construction rules and regulations, when the daily capacity of the treatment plants is 75,000 m3, sand bunkers are designed for washing and dewatering the captured sands from organic substances and for loading the sands into vehicles. The captured sand is transported from sand traps to sand bunkers using hydraulic elevators and washed.

The drainage water separated from the sand bunkers should be returned to the drains that deliver wastewater to the sand traps. To increase the efficiency of sand washing, it is advisable to design them

together with a hydrocyclone with a diameter of 300 mm and a pulp with a pressure of 0.2 MPA (2 kgs/m) in front of the hydrocyclone.

When the capacity of treatment facilities is higher than 100 m3/day, it is necessary to consider the design of sand catchers. It is necessary to choose the types of sand traps (horizontal, tangential, ventilated) taking into account the capacity of treatment facilities, methods of wastewater treatment, processing of sediments, description of suspended sediments, collection solutions, and the like.

In the calculations of horizontal and ventilated sand barriers, their length Ls, m should be determined according to the following expression:

$$Ls=\frac{1000KHV}{U} \quad (3)$$

here: K - QMQ 2.04.03-19. Acceptable coefficient according to table 27 of page 42;

H- calculated depth of the sand trap, m; half of the total depth is accepted for ventilated sand traps;

U- hydraulic density of sand, mm/s; The required diameters of trapped sand particles are accepted.

V- QMQ 2.04.03-19. According to table 28 on page 42, the speed of the receiving wastewater movement, m/s;

When designing sand traps, it is necessary to accept the general calculated dimensions for different types of sand traps:

a) for lying sand catchers - duration of wastewater flow at maximum flow is not less than 30 s;

b) for ventilated sand trap:

0.7 H along the length of one of the walls above the bars for installing ventilators from perforated pipes for sand collection, in the depth;

ventilation rate 3-5 m3*m/(kv*m-h);

the transverse slope of the bottom towards the sand channel is 0.2-0.4;

water injection - matching the direction of water circulation in the sand trap, the ratio of the width to the depth of the section immersed in water -V:N = 1:1.5;

We determine the size of the sand bunker as follows:

$W = W*t, m^3;(5)$

here: t - is the time of holding sand in bunkers, t=1.5-9 days.

The diameter of the bunker is determined by the following expression:

$$D = \sqrt{\frac{4W}{hn}};m \quad (6)$$

here: h- hopper height, h=2,0 metr; n- the number of bunkers should not be more than n - 2, which prevents the sedimentation of organic substances. The size of the W-sand hopper. The volume of each bunker should be at least 20 m3.

References

1. J Orzimatov, S Qurbonova. Using membrane ultrafiltration equipment for drinking water disinfection // Tom 1, Science and Innovation 2022/11/13

2. J.T. Orzimatov. Analysis of the prospects for the use of energy-efficient active solar devices in uzbekistan // American Journal of Applied Science and Technology, Tom 2, 2022/6/30
3. Yu K Rashidov, JT Orzimatov, K Yu Rashidov, ZX Fayziev. The method of hydraulic calculation of a heat exchange panel of a solar water-heating collector of a tube–tube type with a given nonuniform distribution of fluid flow along // Tom 56, Applied Solar Energy 2020/1
4. Yu K Rashidov, JT Orzimatov. Solar air heater with breathable matrix absorber made of metal wire tangle // Tom 5, Scientific-technical journal 2022.Azizovich, N. I. (2022). On The Accuracy of the Finite Element Method on the Example of Problems about Natural Oscillations. *European Multidisciplinary Journal of Modern Science*, 116-124.
5. Nasirov, I. (2022). АКТУАЛЬНОСТЬ ПРИМЕНЕНИЯ МЕТОДОВ МАТЕМАТИЧЕСКОГО МОДЕЛИРОВАНИЯ И МЕТОДОВ КОНЕЧНЫХ ЭЛЕМЕНТОВ В СТРОИТЕЛЬСТВЕ. *Science and innovation*, *1*(A7), 711-716.
6. Носиров, И. А. (2022). МОДЕРНИЗИРОВАНИЕ КОНСТРУКЦИЙ ТУРБОДЕФЛЕКТОРОВ. *CENTRAL ASIAN JOURNAL OF MATHEMATICAL THEORY AND COMPUTER SCIENCES*, *3*(12), 126-130.
7. Nosirov, A. A., & Nasirov, I. A. (2022). Simulation of Spatial Own of Vibrations of Axisymmetric Structures. *European Multidisciplinary Journal of Modern Science*, 107-115.
8. Madaliev, E., Madaliev, M., Mullaev, I., Sattorov, A., & Ibrokhimov, A. (2023, March). Numerical simulation of the layer mixing problem based on a new two-fluid turbulence model. In *AIP Conference Proceedings* (Vol. 2612, No. 1). AIP Publishing.
9. Isroiljonovich, M. I. (2022). USE OF HEAT INSULATION MATERIALS IN HEAT NETWORKS. *CENTRAL ASIAN JOURNAL OF MATHEMATICAL THEORY AND COMPUTER SCIENCES*, *3*(12), 184-189.
10. Israiljonovich, M. I. (2022). HEAT-TECHNICAL CALCULATION OF THE SOLAR COLLECTOR. *CENTRAL ASIAN JOURNAL OF MATHEMATICAL THEORY AND COMPUTER SCIENCES*, *3*(12), 115-120.
11. Mullaev, I. (2022). IMPROVING THE EFFICIENCY OF THE SOLAR-AIR HEATING DEVICE. *Science and Innovation*, *1*(7), 756-761.
12. Madaliyev, E., Makhsitalayev, B., & Rustamova, K. (2022). IMPROVEMENT OF SEWAGE FLATS. *Science and innovation*, *1* (A7), 796-801.
13. Madaliyev, E., & Maksitaliyev, B. (2022). A NEW WAY OF GETTING ELECTRICITY. *Science oath innovation*, *1* (A7), 790-795.Akramovna, U. N., & Ismoilovich, M. R. (2021). Flow Around a Plate at Nonzero Cavitation Numbers. *Central Asian Journal of Theoretical and Applied Science*, *2*(12), 142-146.
14. Umurzakova, M. A., Usmanov, M. A., & Rakhimov, M. N. (2021). ANALOGY REYNOLDS PRI TECHENIYAX AND DIFFUZORNO-CONFUZORNYX KANALAX. *Economics and society*, (3-2 (82)), 479-486.
15. Abbasov, Y., & Usmanov, M. (2022). CALCULATION OF THEIR POWER AND HEATING SURFACE IN IMPROVING THE EFFICIENCY OF AIR HEATING SYSTEMS. *Science and innovation*, *1* (A7), 738-743.

16. Abbasov, YS, Abdukarimov, BA, & Ugli Usmanov, MA (2022). Optimization of Working Parameters of Colorifiers used in Heat Supply Systems. *Central Asian Journal of Theoretical and Applied Science*, *3* (6), 399-406.
17. Maksudov, RI, Dehkanov, SS, & Usmanov, MA (2023). THERMAL INSULATION MATERIALS AND DETERMINATION OF THEIR OPTIMAL THICKNESS. *Economics and society*, (4-1 (107)), 151-157.
18. Abbasov, Y. _ S., & ugli Usmanov, M. _ A. _ (2022). Design of an Effective Heating System for Residential and Public Buildings. *Central Asian Journal of Theoretical and Applied Science*, *3* (5), 341-346.
19. Muminov, O., & Maksudov, R. (2022). HIDROTECHNICS PREVENT VIBRATIONS THAT OCCUR IN CONSTRUCTIONS. *Science and innovation*, *1*(A7), 762-766.
20. Madraximov, M. M., Abdulkhaev, Z. E., & Ilhomjon, I. (2022). Factors Influencing Changes In The Groundwater Level In Fergana. *Int. J. Progress. Sci. Technol.*, *30*, 523-526.
21. Abdulkhaev, Z., Madraximov, M., Arifjanov, A., & Tashpulotov, N. (2023, March). Optimal methods of controlling centrifugal pumps. In *AIP Conference Proceedings* (Vol. 2612, No. 1). AIP Publishing.
22. Мадхадимов, Мамадали Мамадалиевич, Зохиджон Эркинжонович Абдулхаев, and Алимардон Хамдамалиевич Сатторов. "Регулирования работы центробежных насосов с изменением частота вращения." *Актуальные научные исследования в современном мире* 12-1 (2018): 83-88.
23. Madaliev, M. E. U., Maksudov, R. I., Mullaev, I. I., Abdullaev, B. K., & Haidarov, A. R. (2023). Investigation of the Influence of the Computational Grid for Turbulent Flow.
24. Abdulkhaev, Z., Abdujalilova, S., & Abumalikov, R. (2023). CONTROL OF HEAT TRANSFER ABILITY OF RADIATORS USING THERMOVALVE. *Journal of Construction and Engineering Technology*, *1*(1).
25. Erkinjonovich, A. Z., Abdujalilova, S. S., Aminjonovna, A. I., Abdulazizovna, M. N., & Botyrjonovna, Y. A. (2023). Fire Prevention Using an Automatic Shut-of Valve. *CENTRAL ASIAN JOURNAL OF MATHEMATICAL THEORY AND COMPUTER SCIENCES*, *4*(8), 91-94.
26. Abdujalilova, S. S., & Zukhridinovna, R. S. (2023). MEASURING WATER CONSUMPTION IN FITTINGS. *CENTRAL ASIAN JOURNAL OF MATHEMATICAL THEORY AND COMPUTER SCIENCES*, *4*(5), 29-33.
27. Madaliyev, E., Makhsitalayev, B., & Rustamova, K. (2022). IMPROVEMENT OF SEWAGE FLATS. *Science and innovation*, *1* (A7), 796-801.
28. Madaliyev, E., & Maksitaliyev, B. (2022). A NEW WAY OF GETTING ELECTRICITY. *Science oath innovation*, *1* (A7), 790-795.
29. Abdukarimov, B.A., Tillaboyeva F. Sh, va A.T.A'zamjonov. «QUYOSH SUV ISITISH KOLLEKTOR ISILIK QUVURLARIDAGI GIDRAVLIK JARAYONLARNI HISOBLASH». *Ekonomi va sotsium* 4-1 (107) (2023): 4-10.
30. qizi Tillaboyeva, F. S. (2023). QUYOSHLI SUV ISITGICH KOLLEKTORLARINING ISSIQLIK ALMASHINUVI HISOBI. GOLDEN BRAIN, 1(31), 156-162.
31. qizi Tillaboyeva, F. S. (2022). QUYOSH KOLLEKTORLARI. QUYOSH KOLLEKTORLARINING TURLARI VA KOMPONENTLARI. *INTERNATIONAL CONFERENCE ON LEARNING AND TEACHING*, *1*(6), 255-258.

32. Ибрагимова, З. К. К., Хамдамова, Н. С. К., Умуркулов, Ш. Х. У., & Сабиров, Д. Р. У. (2022). Подготовка питьевой воды из маломощных поверхностных водоисточников. Central Asian Research Journal for Interdisciplinary Studies (CARJIS), 2(Special Issue 4), 77-83.

33. OBIDOV J., UMURQULOV S. O ‘ZBEKISTON YASHIL IQTISODIYOT SOHASIDA ISLOHOTLARNI AMALGA OSHIRISHDA MUQOBIL ENERGIYA MANBALARINING O ‘RNI VA AHAMIYATI //Bulletin of Contemporary Studies. – 2023. – Т. 1. – №. 3. – С. 15-18.

34. Solijonov, MV (2022). QUYOSH ENERGİYAsidan FOYDALANGAN YANGI QOYISH HAVO ISITISH PARAMETRLARINI ISHLAB CHIQISH PARAMETRLARINI OPTİMLAYTIRISh. *MATEMATİK NAZARIYA VA INFORMATYA FANLARI MARKAZIY ASIAN JURNALI*, *3* (12), 190-197.

35. Abdukarimov, BA, Solijonov, MV, & Abdumalikov, RR (2023). AN'VANSIY VA QAYTA OLiladigan ENERGIYA MANBALARI ASOSIDA ISHLAB CHIQISH ISILIK TA'MINLANISH TIZIMLARINI TADQIQOT. *OLTIN MIYA*, *1* (1), 253-255.

36. Abdukarimov, A., Solijonov, M., & Abduxamidov, A. (2022). QUYOSH ENERGIYASIDAN FOYDALANISHDA YANGI SOLAR HAVO ISITISHLARNING ISHLATILISH PARAMETRLARINI OPTİMLAYTIRISh. *Fan va innovatsiyalar*, *1* (A8), 815-823.

37. Qosimov A. S., Srojidinov D. R. AVTOPOEZDLAR TORMOZ MEXANIZIMLARI PNEVMATIK QUVIRLARINING TEXNIK HOLATINI, AVTOPOEZDLARNING MOS TURIGA TADBIQ QILISH //Educational Research in Universal Sciences. – 2023. – Т. 2. – №. 3. – С. 474-480.

