IMPROVEMENT OF SEWAGE FLATS

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Abstract .*In the article, a scheme for increasing the water transfer capacity and improving the efficiency of sewerage channels has been developed.*

Keywords*: wastewater, collectors, channels, hydraulic radius, flow shear, hydraulic slope, equivalent roughness, wetted perimeter.*

БЛАГОУСТРОЙСТВО КАНАЛИЗАЦИИ КВАРТИРЫ

Аннотация. *В статье разработана схема увеличения водопропускной способности и повышения эффективности канализационных каналов.*

Ключевые слова: *сточные воды, коллекторы, каналы, гидравлический радиус, сдвиг течения, гидравлический уклон, эквивалентная шероховатость, смоченный периметр.*

INTRODUCTION

Wastewater is water used for domestic purposes, production and agriculture, as well as water that has passed through a certain polluted area. Wastewater is divided into 3 types depending on the conditions of its formation:

1. Household wastewater of daily life
2. Industrial wastewater
3. Atmospheric waters

Domestic water is the water produced from washing the shower, bathroom, laundry, dining room, toilet, floor. These waters contain 58% organic and 42% mineral impurities.

MATERIALS AND METHODS

Atmospheric waters - waters that appear from rain and snow melt and flow from the territory of the enterprise. They are contaminated with organic and mineral impurities.

Industrial wastewater is a liquid waste generated during the extraction and processing of organic and inorganic materials.

Wastewater is discharged through networks of pipes and channels. For this, pipes of different shapes and materials are used. In the history of sewage discharge, circular, elliptical, trapezoidal, quadrilateral, pentagonal, semi-elliptical and other shaped pipes and collectors have been used. Most of the pipes used are circular, in some cases, large rectangular collectors are used. Besides, the circular shape is the most convenient from the hydraulic point of view, because it has the smallest hydraulic radius..[1]

The hydraulic radius is the ratio of the live shear (ω) of the pipe to the wetted perimeter (ч), that is::

$$R = \omega / \chi . \qquad (1)$$

Hydraulic radius in an overflowing circular pipe:

$$R = \frac{\omega}{\chi} = \frac{\pi d^2}{4\pi d} = \frac{d}{4} = 0{,}25d \text{ is equal to.} \quad (2)$$

Sewer trays are depicted in Figure 1

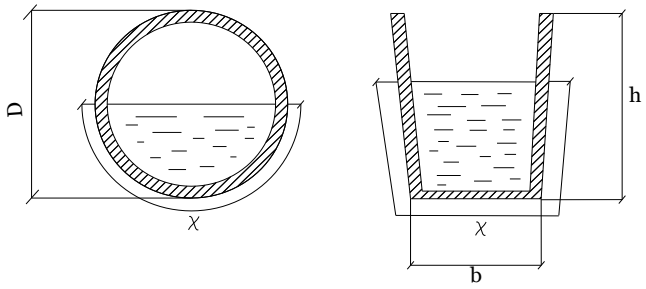


Figure 1.

Circular and trapezoidal sewer trays.

At the water level h=0.813d, the hydraulic radius is equal to the maximum value, i.e. 0.304d. The maximum throughput of pipes occurs at h=0.95d. The pipe diameter, laying slope, pressure loss, flow rate, and filling level for the discharge of sewage of a given consumption are determined using hydraulic calculations. The hydraulic calculation is carried out on the basis of the condition that the sewage arrives at the beginning of the section and moves in a straight manner, and is performed on the basis of the following equations:

Flow continuity equation:

$$q = \omega v \quad (3)$$

where q is the maximum calculated consumption of sewa

ω- live shear of the stream, m;

v- average speed of flow, m/sec.

The discharge networks are calculated using the tables and graphs based on the Shezi equation, calculating the maximum second consumption:

$$v = C\sqrt{RI}\,, \quad (4)$$

where R is the hydraulic radius, m;

I - hydraulic slope:

$$h = \lambda \frac{v^2}{8Rg} \quad (5)$$

C - the coefficient depending on the hydraulic radius, the roughness of the wetted surface and is determined using the following equation:

$$C = \frac{R^y}{n_1}, \quad (6)$$

$$y = 2{,}5\sqrt{n_1} - 0{,}13 - 0{,}75R(\sqrt{n_1} - 0{,}1)\,; \quad (7)$$

n_1 - gadir - coefficient of roughness, circular shape 0.014 for collectors, 0.013 for pressure conductors.

λ - the coefficient of longitudinal friction can be determined using the equation that takes into account the degree of turbulence of the flow:

a) for pressurized flow

$$\frac{1}{\sqrt{\lambda}} = -2\lg\left(\frac{\Delta}{3{,}42d} + \frac{a_2}{\mathrm{Re}}\right), \quad (8)$$

b) for pressureless flow

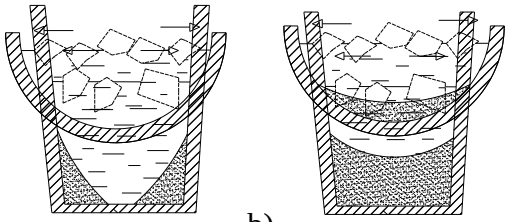
$$\frac{1}{\sqrt{\lambda}} = -2\,lg\left(\frac{\Delta}{13{,}68R} + \frac{a_2}{\mathrm{Re}}\right), \quad (9)$$

Δ - equivalent roughness, cm;

a_2 - gadir is a coefficient that takes into account the type of swelling;

Re - Reynold's number. [1]

All these trays have their own advantages and disadvantages. Trapezoidal and rectangular trays have 1.5 times more clogging ability than circular trays, because the moving waste moves towards the tray wall. As such waste increases, the blockage increases, and the waste water flows out of the tray in that place.



a) b)

Fig. 2.

Sedimentation of heavy substances in sewer trays over time is depicted.

Figure 2 shows the movement of debris towards the tray wall, and the bottom part shows the area where the heavy fashions are found the most. Over time, the accumulation of nodules in this part increases and comes to the next appearance. Because it is difficult to wash off the sedimented substances in places where the water speed decreases, so these substances accumulate. If the water level decreases, the water will accumulate and stop flowing. Because water does not always flow in the sewers. Semi-circular trays are more economical and less prone to clogging. In such laths, even in places where water consumption is low, clogs are formed. Due to the small hydraulic height of these laths, large bodies cannot move. cannot move by touching the bottom of the tray.[2]

RESULTS

In the tray that we would like to recommend, the material moves towards the center, not towards the pipe wall. This tray has an additional height compared to semi-circular trays because the hydraulic head is L+r. In such cases, the pushing force, the Archimedean force, increases by 35% compared to ordinary laths. Therefore, the substances that get stuck in normal trays can

move in the tray we recommend. As a result, the blockage of waste is reduced by 2 times compared to semi-circular trays.

DISCUSSION

This tray is illustrated in Figure 3.[3]

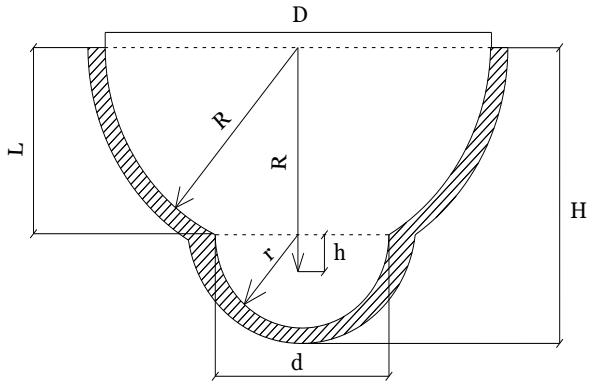


Fig. 3. The scheme of sewer trays that we recommend.

R is the radius of the large semicircle in the figure:

$R=2r.$ (10)

r-small turning radius, H-total plate height,

$H=L+r.$ (11)

L-the distance between the centers of both semicircles is determined using the following L-formula.

$L=0.85R$ *or* $L=1.7r.$ (12)

h-the size taken in relation to the diameter of the plate.

$h=R-L.$ (13)

CONCLUTION

The movement of water in this tray is illustrated in Figure 4.

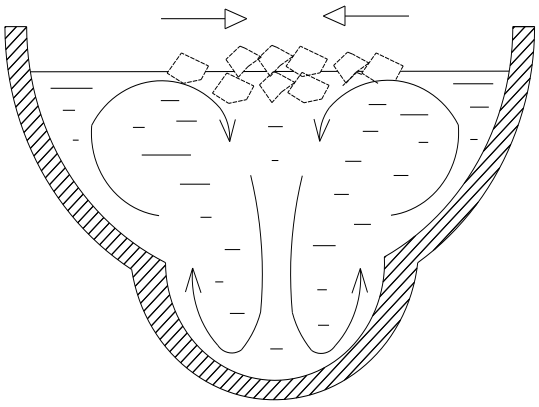


Fig. 4. The movement of water in Latok.

Figure 4 shows that the movement of water is circular from top to bottom. Therefore, the deposited sediments move up and towards the center. If the water consumption decreases, they move in a small semicircle.

REFERENCES

1. Malikov, Z. M., & Madaliev, E. U. (2019). Mathematical simulation of the speeds of ideally newtonovsky, incompressible, viscous liquid on a curvilinearly smoothed pipe site. Scientific-technical journal, 22(3), 64-73.
2. Madaliev, E. U., & qizi Abdukhalilova, S. B. (2022). Repair of Water Networks. CENTRAL ASIAN JOURNAL OF THEORETICAL & APPLIED SCIENCES, 3(5), 389-394
3. Akramov, A. A. U., & Nomonov, M. B. U. (2022). Improving the Efficiency Account Hydraulic of Water Supply Sprinklers. Central Asian Journal of Theoretical and Applied Science, 3(6), 364-370..
4. Сатторов, А. Х., Акрамов, А. А. У., & Абдуразаков, А. М. (2020). Повышение эффективности калорифера, используемого в системе вентиляции. Достижения науки и образования, (5 (59)), 9-12.
5. Xamdamaliyevich, S. A., & Rahmankulov, S. A. (2021, July). Investigation of heat transfer processes of solar water, air contact collector. In E-Conference Globe (pp. 161-165).
6. Madaliev, M. E. U., Rakhmankulov, S. A., & Tursunaliev, M. M. U. (2021). Comparison of Finite-Difference Schemes for the Burgers Problem. Middle European Scientific Bulletin, 18, 76-83
7. Abdullayev, B. X., & Rahmankulov, S. A. (2021). Modeling Aeration in High Pressure Hydraulic Circulation. CENTRAL ASIAN JOURNAL OF THEORETICAL & APPLIED SCIENCES, 2(12), 127-136.
8. Nasirov Ismail Azizovich. On The Accuracy of the Finite Element Method on the Example of Problems about Natural Oscillations. EUROPEAN MULTIDISCIPLINARY JOURNAL OF MODERN SCIENCE https://emjms.academicjournal.io
9. Usmonova, N. A., & Khudaykulov, S. I. (2021, April). SPATIAL CAVERNS IN FLOWS WITH THEIR PERTURBATIONS IMPACT ON THE SAFETY OF THE KARKIDON RESERVOIR. In E-Conference Globe (pp. 126-130).
10. ugli Mo‘minov, O. A., Maqsudov, R. I., & qizi Abdukhalilova, S. B. (2021). Analysis of Convective Finns to Increase the Efficiency of Radiators used in Heating Systems. Middle European Scientific Bulletin, 18, 84-89.
11. Maqsudov, R. I., & qizi Abdukhalilova, S. B. (2021). Improving Support for the Process of the Thermal Convection Process by Installing. Middle European Scientific Bulletin, 18, 56-59.
12. Shavkatjon o‘g‘li, T. B. (2022). Proving The Inequalities Using a Definite Integral and Series. Texas Journal of Engineering and Technology, 13, 64-68.
13. Shavkatjon o’g’li, T. B. (2022). SOME INTEGRAL EQUATIONS FOR A MULTIVARIABLE FUNCTION. Web of Scientist: International Scientific Research Journal, 3(4), 160-163.
14. Мадхадимов, М. М., Абдулхаев, З. Э., & Сатторов, А. Х. (2018). Регулирования работы центробежных насосов с изменением частота вращения. Актуальные научные исследования в современном мире, (12-1), 83-88.
15. Mo‘minov, O. A. O‘tbosarov Sh. R.“Theoretical analysis of the ventilation emitters used in low-temperature heat supply systems, and heat production of these emitters” Eurasian journal of academic research, 495-497.

16. Abdukarimov, B. A., O'tbosarov, S. R., & Tursunaliyev, M. M. (2014). Increasing Performance Efficiency by Investigating the Surface of the Solar Air Heater Collector. NM Safarov and A. Alinazarov. Use of environmentally friendly energy sources.
17. Rashidov, Y. K., & Ramankulov, S. A. (2021). Improving the Efficiency of Flat Solar Collectors in Heat Supply Systems. CENTRAL ASIAN JOURNAL OF THEORETICAL & APPLIED SCIENCES, 2(12), 152-159
18. Madraximov, M. M., Nurmuxammad, X., & Abdulkhaev, Z. E. (2021, November). Hydraulic Calculation Of Jet Pump Performance Improvement. In International Conference On Multidisciplinary Research And Innovative Technologies (Vol. 2, pp. 20-24).
19. Рашидов, Ю. К., Орзиматов, Ж. Т., Эсонов, О. О. Ў., & Зайнабидинова, М. И. К. (2022). СОЛНЕЧНЫЙ ВОЗДУХОНАГРЕВАТЕЛЬ С ВОЗДУХОПРОНИЦАЕМЫМ МАТРИЧНЫМ АБСОРБЕРОМ. Scientific progress, 3(4), 1237-1244.
20. Усаров, М. К., and Г. И. Маматисаев. "Вынужденные колебания коробчатой конструкции панельных зданий при динамических воздействиях." Проблемы механики 2 (2010): 23-25.
21. Усаров, Махаматали Корабоевич, and Гиёсиддин Илхомидинович Маматисаев. "КОЛЕБАНИЯ КОРОБЧАТОЙ КОНСТРУКЦИИ КРУПНОПАНЕЛЬНЫХ ЗДАНИЙ ПРИ ДИНАМИЧЕСКИХ ВОЗДЕЙСТВИЯХ." Научный форум: технические и физико-математические науки. 2019.
22. Madaliev, M. E. U., Maksudov, R. I., Mullaev, I. I., Abdullaev, B. K., & Haidarov, A. R. (2021). Investigation of the Influence of the Computational Grid for Turbulent Flow. Middle European Scientific Bulletin, 18, 111-118.
23. Hamdamalievich S. A. Determination of the deposition of particles contained in the water passing through the sump well //Central asian journal of theoretical & applied sciences. – 2022. – Т. 3. – №. 6. – С. 244-251.
24. Hamdamalievich S. A., Nurmuhammad H. Analysis of Heat Transfer of Solar Water Collectors //Middle European Scientific Bulletin. – 2021. – Т. 18. – С. 60-65.
25. Nosirov A.A., Nasirov I.A. Simulation of Spatial Own of Vibrations of Axisymmetric Structures EUROPEAN MULTIDISCIPLINARY JOURNAL OF MODERN SCIENCE https://emjms.academicjournal.io
26. Рашидов, Ю. К., Орзиматов, Ж. Т., & Исмоилов, М. М. (2019). Воздушные солнечные коллекторы: перспективы применения в условиях Узбекистана. *ББК 20.1 я43 Э 40*.
27. Abobakirovich, A. B., Sodikovich, A. Y., & Ogli, M. I. I. (2019). Optimization of operating parameters of flat solar air heaters. Вестник науки и образования, (19-2 (73)), 6-9.
28. Умурзакова, М. А., Усмонов, М. А., & Рахимов, М. Н. (2021). АНАЛОГИЯ РЕЙНОЛЬДСА ПРИ ТЕЧЕНИЯХ В ДИФФУЗОРНО-КОНФУЗОРНЫХ КАНАЛАХ. *Экономика и социум*, (3-2), 479-486.
29. Abbasov, Y. S., & ugli Usmonov, M. A. (2022). Design of an Effective Heating System for Residential and Public Buildings. *CENTRAL ASIAN JOURNAL OF THEORETICAL & APPLIED SCIENCES*, *3*(5), 341-346.
30. Usmonova, N. A. (2021). Structural Characteristics of the Cavern at a Fine Bubbled Stage of Cavitation. Middle European Scientific Bulletin, 18, 95-101.