Table

Wastewater Characteristics at the entrance and exit after of sewage treatment plants in the city of Luninets

Pollution index	Concentration of pollutants in wastewater entering treatment, mg/dm^3		Concentration of pollutants in waste water discharged after treatment facilities, mg/dm^3		Efficiency purification, %	
	medium	maximum	medium	maximum	actual	project*
COD	280,0	780,4	89,58	135,0	68	**
BOD5	148,3	546,4	22,1	33,6	85	90
suspended solids	181,0	321,0	30,2	38,2	83	90
Ammonium ion, mgN/dm^3	37,3	63,9	17,6	24,7	53	
Oil and oil products	1,07	1,71	0,29	0,47	73	–
Synthetic surfactants (anionic)	1,18	1,98	0,42	0,76	64	–
total iron	2,44	4,57	0,88	1,52	64	–
Zinc	0,026	0,066	0,013	0,025	50	–

Despite the noted shortcomings, biological treatment of municipal wastewater and drains of many industries are widespread. In the Republic of Belarus there are more than 140 biological treatment facilities, including 72 facilities with a capacity of more than 1 million m3 purified water per year, where 90 % of the total runoff in the Republic is treated.

ONE-DIMENSIONAL MODEL OF NON-ISOTHERMAL MOISTURE TRANSFER IN ENCLOSING CONSTRUCTION

E. Kresova[1], I. Gishkeluk[2], S. Kundas[3]

[1] *Belarusian State University, ISEI BSU, Minsk, Republic of Belarus*

[2] *Private Unitary Enterprise «Framework» Minsk, Republic of Belarus*

[3] Belarusian National Technical University Minsk, Republic of Belarus

elena-kresova@mail.ru

In modern construction multilayered enclosing structures with effective heat-insulating materials are applied. Such constructions increase the requirements for the quality of their design because the heterogeneity of used materials exacerbates possible design errors and leads to decrease in heat-shielding properties and durability of structures. It is associated with a sharp change in their moisture regime. Therefore, it determines the requirements of improving reliability in forecasting of moisture regime and the level of thermal protection of enclosing structures. In the work, one-dimensional model of non-isothermal moisture transfer is created for the enclosing construction.

Keywords: non-isothermal moisture transfer, enclosing construction, software package «SPS», equation of moisture transfer, adapted equation.

Moisture content in building structures has a significant effect on both the thermal insulation and the operational properties of building structures. Moisture causes or accelerates the following processes: electrochemical corrosion of metal products and details, chemical damage of materials, destruction of concrete, stone and brickwork during freezing and thawing, change the color of architectural details of buildings, change in the volume of construction materials (swelling, buckling, shrinkage). It can lead to deterioration in appearance, the appearance of cracks and deformation of structures, biological damage. Increasing the moisture content also leads to a decrease of thermal resistance of enclosing structures.

Nowadays biological damage caused by moisture is given special importance because these phenomena can affect the health of people, condition of structures and appearance of buildings. Therefore, at present much attention is paid to modeling of moisture transfer in enclosing structures.

To analyze the processes of moisture transfer in building structures a software package «SPS» (Simulation Processes in Soil) was adapted [1].

The equation of non-isothermal moisture transfer which is built in the software package «SPS» was obtained using thermodynamic laws, moisture sorption isotherms, and two-phase filtration equations. Unlike the two-phase filtration equations in the modified equation for determining the dependence of the fluid pressure on the moisture content and temperature, there is no need to experimentally determine the Leverett function. In the proposed model, the equation of non-isothermal moisture transfer is obtained in the form, in which the intensity of mass transfer does not include explicitly. First, the intensity of mass exchange can not be determined experimentally. Secondly, it is a highly nonlinear function of moisture content and temperature, which has an order comparable to the values of flows. It often leads to the divergence of difference scheme in numerical solution.

In deriving the equation of non-isothermal moisture transfer that motion of fluid and water vapor occurs in the field of gravity. In enclosing structures it can be neglected.

In the work, one-dimensional model of non-isothermal moisture transfer for the enclosing construction of building is created.

BIBLIOGRAPHY

1. Kundas S. P., Gishkeluk I. A., Kovalenko V. I., Hilko O. S. Computer modelling of contaminant migration in natural disperse media / edited by S. P. Kundas. – Minsk: ISEU, 2011. – 212 p.

ANALYSIS OF TECHNOLOGICAL CONSUMPTION OF WATER IN THE MUNICIPAL WATER SUPPLY AND USE WASTE WATER TREATMENT BY THE EXAMPLE OF CITY GRODNO

E. Kruk, N. Lysuho

Belarusian State University, ISEI BSU,
Minsk, Republic of Belarus
nlysukha@mail.ru

Currently RUE "CRICUWR"(Central Research Institute for Complex Use of Water Resources) is a specialized state scientific-research organization in the sphere of integrated water resources management of the Ministry of natural resources and environmental protection of the Republic of Belarus. It was established in accordance to the resolution of the Council of Ministers of the USSR on April 22nd, 1960, № 425 "On measures on streamlining of use and increased protection of water resources of the USSR" and the decree of the Presidium of the Academy of Sciences of BSSR on February 14, 1961, No. 10.

A comprehensive assessment of the impact of housing and communal services has been conducted on the model of Grodno on the environment, regulation of water use (rationing of water use and sanitation, the development of scientifically based suggestions for the regulation of wastewater discharges), calculation of norms of process water in the municipal water supply, the calculations of the rate of losses and unaccounted for water from the municipal water supply, environmental and feasibility study comprehensive solution to the problem of surface runoff (rain and meltwater) with a built-up area of the settlement. Were considered the main legal acts and technical normative legal acts in the sphere of use and protection of waters, studied and systematized data in 2012–2013 and the prediction of water flow in the municipal water supply in 2014 on the model of the regional enterprise the necessary calculations have been made.

Keywords: environmental protection, water protection, integrated impact assessment.

Work in RUE "*CRICUWR*" was held at the Department of regulation impacts on the environment and was carried out in two main areas:

- gathering information about the legislation and methodological approaches to calculating technological losses of water in the municipal water supply;
- analysis of the use of waste water treatment in the Republic of Belarus.

Our main purpose was to calculate the norms of process water consumption based on data from 2012 to 2013 and prediction for 2014. The Main document on the basis of which the calculations were made is the decree of the Ministry of housing and communal services of the Republic of Belarus we from December 29, 2004 № 39 "On approval of the instruction on assessment and calculation of the standard technological losses of water in the municipal water supply of settlements of the Republic of Belarus".

This instruction establishes the structure, definition and assessment of technological water consumption for operators of municipal (city, town) drinking water supply systems of settlements of the Republic of Belarus, reglementary of the collection and processing of initial information in tabular form for assessment of technological water