

The obtained value of the yarn tension increment allows us to conclude that for fixed parameters  $\omega$ ,  $L$ ,  $dm$  the increment of tension is proportional to the square of the radius.

With the development of the technology the optimization of the technological process was carried out. Criteria for optimization are the breaking in the process of formation and the filling of the core by the pile component. It has been experimentally established that the most influential parameters on the breaking are the velocities of the core and covering components fed into the formation zone, as well as the linear density of the core component.

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## HYDROCARBON POLLUTION OF THE RIVERS OF THE INDUSTRIAL CENTERS IN VITEBSK REGION

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*Abstract. The greatest amount of environmental pollution comes from industrial enterprises. Pollutants are transferred at large distances falling into watercourses in different ways. This can cause contamination of adjacent territories. The Vitebsk region is a developed industrial region, which contains many organizations or production units, where used oil and oil products. There is always the risk of accidents and emergencies at industrial complex, including the risk of pollutant transfer into water bodies. A study of the state of the region's water bodies under these conditions is very relevant.*

The aim of the work is an analytical assessment of watercourses flowing through the largest industrial centers of the Vitebsk region, from the position of ecological risk of pollution of water areas with oil products.

The State Water Cadastre materials were used for the work, including summary data on water resources and their quality in previous years. We used a statistical and contrastive-comparative method of investigation.

The result of statistical analysis of the data set [1]:

– Value of runoff highly variable. From year to year the amount of precipitation varies, because of the specific circulation. All this is reflected in the river runoff, the same dynamics which can be seen in the basins of the Western Dvina and the Dnieper rivers. Since 2013 a sharp decrease in river flow has been noticed, which is favorable from the point of view of ecological risk of water pollution, because with the reduction of volume of melted snow and rain water fills the river, which is surface runoff, and decreases the probability of falling pollutants from industrial areas and industrial facilities into the waters.

– The concentration of oil products in points of hydrochemical observations is constant and minimal in recent years. In the period from 2003 to 2007, the observed sharp increase of the oil concentration in the Dnieper river, which is associated with the process discharge of pollutants from the Russian Federation. The most influential industrial centers on pollution of rivers with oil products are Orsha, Polotsk and Novopolotsk.

– Dynamics of the water contamination index in points of the hydro-chemical observation shows that over time the water in the rivers has changed for the class of pollution moderately polluted to clean – the basin of the river Western Dvina, and from contaminated to clean – the basin of the Dnieper river. Most large load of the river comes from the cities: Orsha (mostly), Polotsk, Novopolotsk. The value of self-purification of rivers is small, because the pollutants remain almost in its amount from one locality to another.

– The average annual discharge of wastewater into water bodies in the Vitebsk region is 141.6 million m<sup>3</sup>/year – the 4th value for the country. The volume of wastewater of Novopolotsk in water bodies is quite varied, compared to Vitebsk twice as high as average values across the region and Vitebsk, although the volume of regulatory treated wastewater is approximately equal. The value of the discharge of contaminated wastewater in the region is minimal and is constant in contrast to the country's values.

– In the Vitebsk region the capacity of the treatment plant, after which the wastewater is discharged into water bodies, varies markedly over the years, increasing, and again decreasing its rate, thus becoming extremely unstable. From the viewpoint of environmental risk, the most favorable situation would be a tendency to increase the power values.

– The volume of discharge of oil and oil products in water bodies in recent years have stabilized. Novopolotsk detected its significant "contribution" to the rivers of the region: the overall average rate of dumping of petroleum products in the waters of the Vitebsk region is only 1,7 times more than in Novopolotsk.

For the location of industry characterized by a high level of territorial concentration – 4 the largest industrial center – Vitebsk, Orsha, Novopolotsk, Polotsk account for about 70% of the products of the industry in the region. However, this situation creates the risk of water pollution of basins of the rivers Western Dvina and the Dnieper due to their immediate adjacency to the industrial centers. The concentration of oil products in points of hydrochemical observations in recent years is constant and minimum, over time the water in the rivers has changed for the class of pollution moderately polluted to clean. The worst cities from the perspective of environmental risk of water pollution with oil products are Novopolotsk and Orsha.

#### References

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