collector. But the fact that it will be remembered, will make a proper impression and will certainly go down in architectural history – this is absolutely certain.

Amazing achievements of modern architecture:

Mary Ax Tower, 30 or Saint Mary Ax, 30 is a skyscraper in London, which is one of the main modern landmarks of the city. The skyscraper surprises with its unusual structure, which is made in the form of a mesh shell with a central support base. It was built with consideration for the laws of aerodynamics. The bob-shaped structure is resistant to wind loads and therefore reduces wall loads, frees up large spaces inside the building and even allows skyscraper windows to be opened. The tower is made entirely of glass, has a height of 180 meters and has 41 floors, has an oval elongated shape, and it is slightly widened in the middle. Due to the round shape of the tower, the wind smoothly bends around it, and therefore pedestrians are not threatened by suddengusts of wind, as is the case with rectangular skyscrapers. The building is faced with 745 glass panels, their area is equal to 5 football fields.

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ENVIRONMENTAL IMPACT OF THE SURROUNDING SURFACE ON HEAT TRANSFER AERODYNAMICS OF CONICAL CHIMNEY THERMAL POWER STATION

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Introduction. The safety of modern TPS significantly depends on the reliable operation of the whole complex of main and auxiliary equipment. Its periodic replacement and modernization apply only to the main equipment of TPS and do not apply to chimneys. This leads to the fact that currently the chimneys work with parameters for which they were not designed. This state of chimneys is largely detrimental to the ecological situation of the planet.

The aerodynamics of chimneys determines the thermal processes and conditions of moisture loss inside the pipe. The flow conditions are influenced by the local conditions and infrastructure of the facilities located on the territory of the TPS. Unfortunately, this fact is not taken into account in the calculations. In the thermal calculation, as a rule, the average heat transfer coefficient of the outer surface of the pipe is determined [1]. This gives unreliable conditions for condensate precipitation and leads to errors in the choice of internal corrosion protection of the pipe. Another significant nuance is the uneven distribution of the pressure coefficient along the perimeter when flowing around the chimney with the flow of air, which is not taken into account.

The general part. The paper considers the local aerodynamics and heat transfer during the flow around a single conical chimney minus the profile of the incident flow (surface infrastructure).

For calculation in the program ANSYS2020-R1, a computer model of a vertical conical pipe 40 m high, with a diameter of 1.7 m at the base and 0.85 m at the mouth was created. As a model of turbulence, the traditional for problems of this class RNG k-ε, wall function Enhanced Wall Function, the solution algorithm for the connection of the velocity pressure in stable flows Simplex. Grid sensitivity analysis and model verification were performed.

It is determined that at a distance of the first node from the cylinder wall and the area of interest (Growth rate GR), more than 8 mm, instability and deviation of more than 20% of the obtained data from the values of the average heat transfer coefficient by a known formula $\alpha_0 = 7{,}3 \cdot w_x^{0{,}66}$. Calculation of the resolution to determine the optimal parameters of the grid model, corresponding to the variant GR = 1.1 and h = 8 mm [2].

In the calculations, three types of surrounding areas are considered: open coasts of seas, lakes and reservoirs, rural areas, including buildings with a height of less than 10 m (Fig. 1, A); urban areas, forests and other areas, evenly covered with obstacles higher than 10 m (Fig. 1, B); urban areas with dense buildings with buildings more than 25 m high (Fig. 1, C). Therefore, the velocity profiles for different types of terrain are nonlinear and depend on the type of terrain. The periodic change of static pressure in the area behind the pipe due to the conical profile of the pipe and the peculiarities of the infrastructure are revealed. As calculations have shown (Fig. 2), the wind speed profile in front of the pipe has a significant effect on the heat transfer coefficient: the data for type A surfaces are higher, and for type C surfaces are lower than for a uniform flow profile. This confirms the need to take into account the infrastructure of the surface around the pipe in the aerodynamic and thermal calculations of chimneys.

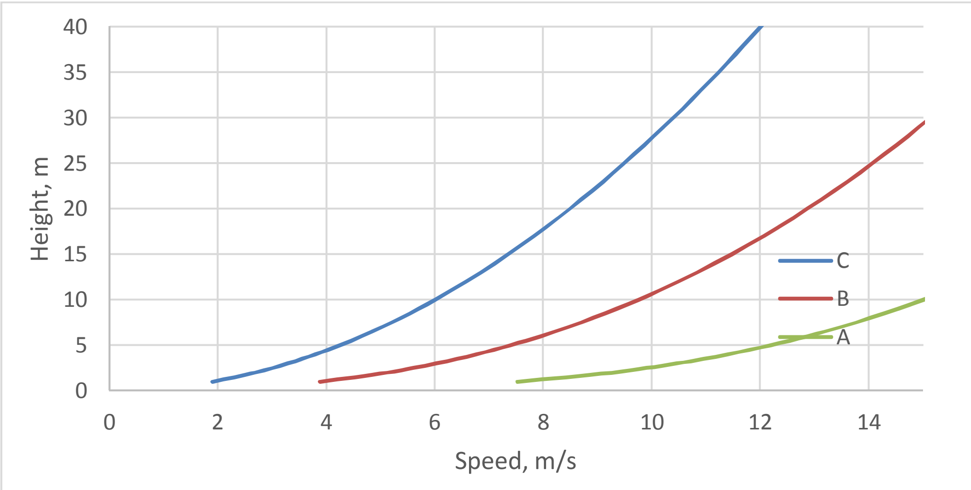

Figure 1 – Speed profile wind for different types of terrain and an average wind speed of 10 m / s

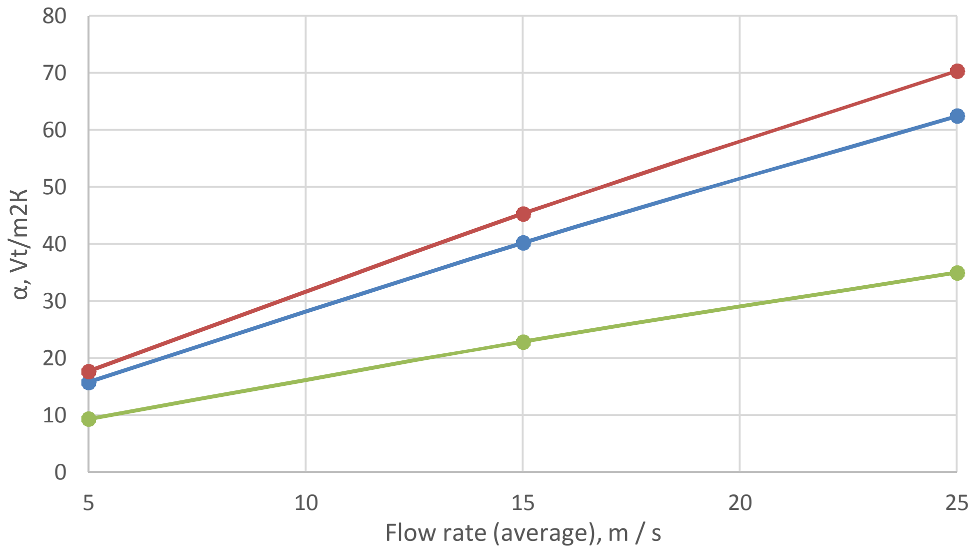

Figure 2 – The dependence of the average height of the pipe heat transfer coefficient on the average wind speed

Conclusions. Calculations have shown a significant impact of the infrastructure of the surrounding space on the external aerodynamics and heat transfer of the conical chimney. Thus, when calculating real chimneys, it is necessary to take into account the infrastructure of a thermal power station. Thanks to this calculation, we can reduce the reduction in heat transfer of chimneys and emissions of harmful substances in the lower atmosphere.

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