

II INTERNATIONAL CONFERENCE  
Krasnoyarsk-St Petersburg, RUSSIA  
3-6 March 2021



# «Metrological Support of Innovative Technologies» ICMSIT-II 2021

«Improvement of aerodynamic characteristics of air propellers of wind power plants using jet mechanization of blades»

Dmitry Ivanovich Osovsky and Aleksey Sergeevich Sharatov



**ICMSIT**

Metrological Support  
of Innovative Technologies

# Problem statement

- The wind power stations in China, India and the United States, which have been in operation for more than 5-10 years, require updating and increasing their efficiency.
- For countries with high potential for the development of wind power, it is possible to create and develop ways to increase the efficiency of wind power plants (WPP). It will provide the possibility of modernizing existing WPPs, as well as designing new ones.
- The task of increasing the efficiency of wind power plants can be solved through the use of jet mechanization of the propeller blade

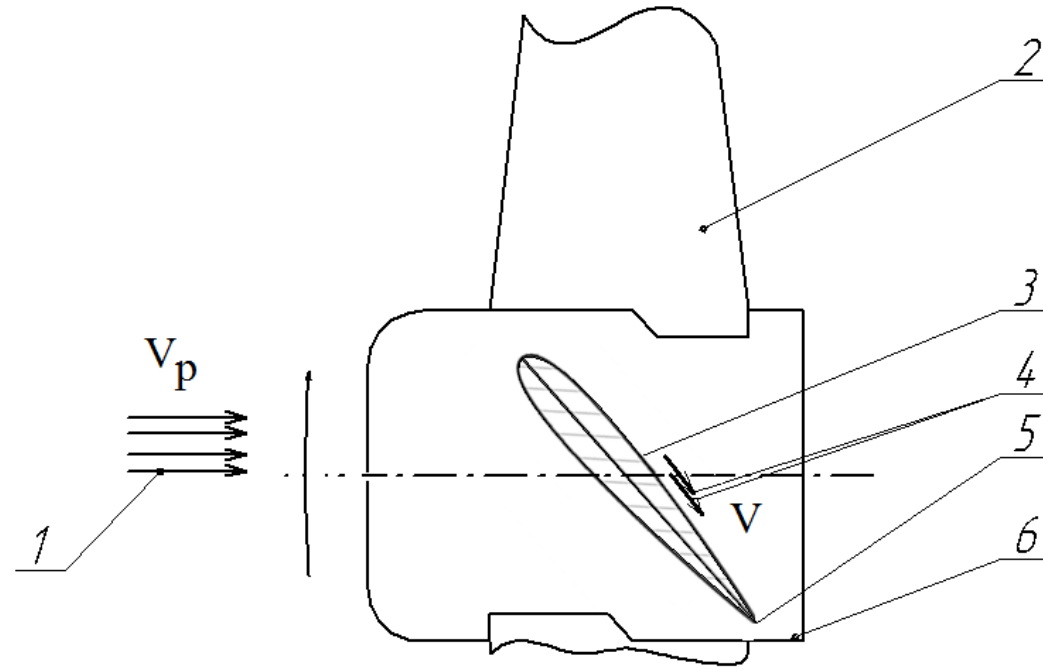


**ICMSIT**

Metrological Support  
of Innovative Technologies

# Solution methods

- Jet air supply, due to the installation of a slotted nozzle on the leading edge of the blade, allows to increase speed circulation on the profile blades and the effective chord area. This method will improve the efficiency of wind power plants, as well as use them at a reduced wind speed.



**Figure 1.** – Elements of a vane-type machine of a wind power plant: 1 – oncoming flow, 2 – blade, 3 – suction surface of the blade, 4 – additional flow, 5 – end edge of the blade, 6 – hub.

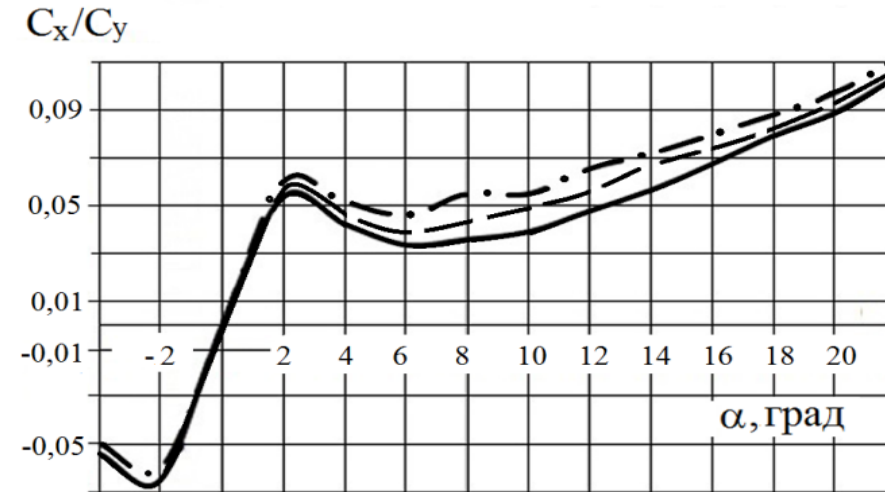


**ICMSIT**

Metrological Support  
of Innovative Technologies

# Conclusions

## Results, implementation



**Figure 2.** – Calculated coefficient of inverse quality of the profile NACA 0012 propeller blades with additional jet air supply to the profile, taking into account the ratio of the profile resistance coefficients ( $C_x$ ) and the lift coefficient ( $C_y$ ): dash-dotted line - when air is supplied with the ratio of speeds  $V/V_p = 0$ ; dotted line - when air is supplied with the velocity ratio  $V/V_p = 1$ ; solid line - when air is supplied with a speed ratio  $V/V_p = 2$ .



**ICMSIT**

Metrological Support  
of Innovative Technologies

# Contacts

Dmitry Ivanovich Osovsky

Aleksey Sergeevich Sharatov

Department of Ship Power Plants

**Kerch State Maritime Technological University**

E-mail: [relicts@narod.ru](mailto:relicts@narod.ru), [seykgmtu@gmail.com](mailto:seykgmtu@gmail.com)

II INTERNATIONAL CONFERENCE  
Krasnoyarsk - St Petersburg, RUSSIA  
3-6 March 2021

**«Metrological Support of Innovative Technologies»  
ICMSIT-II 2021**