

METHODS OF IMPROVEMENT OF ACOUSTIC PERFORMANCES OF TURBOFAN ENGINE

Nowadays the problem of decreasing of noise of environment is a global problem. The solution of this problem depends on different countries and the culture, economics and policy of it. Nowadays there is no single system of checking of sequences of acting of noise on environment on population and cost of damages.

One of the most important problems of civil aviation is the noise on the area. To decrease intention of noise which is distributed in intake unit of the engine next solutions are developing:

- Adaptive soundabsorbing constructions (SAC)
- Increasing of relative area of SAC surface of channel due to decreasing of joints between elements of construction
- Applying of 3-dimensional SAC

Also one of the noisiest parts of the engine is fan. In order to provide minimal noise it is necessary to apply single stage fan. It is necessary to use damp of the fan's noise, which are located on the way of distributing of sound waves on the way of suction and exhaust. Also soundabsorbing coating are widely used.

If we say about methods of reducing of noise of engine jet stream there are two methods: active and passive. Active methods of noise reducing are based on changing of aerodynamic performances of deflection layer within the initial section of the jet. For example coaxial stream is formed with higher velocity of central steam and with lower velocity in central steam. This leads to decreasing of shearing stresses in deflection layer.

Reducing of the noise of the steam can also be achieved by using acoustic impact on the steam and also by means of different mechanical devices which are located on the section of jet nozzle for example multielement attachments, flow dividers, ejectors etc.

To the passive methods of noise reducing belong reducing of the noise on the way of it distributing from the source. The most effective passive method of noise reducing of the jet steam is radiation shielding of the stream by means of airframe elements – wing, tail or soundabsorbing lining ejector muffler.

Also soundabsorbing constructions are widely used. Noise reduction systems of power plants of modern aircrafts are based on application in the channels of nacelles and engines with soundabsorbing structures with resonance or volume absorbers. They are the most effective methods of reducing of noise intensity generated by vane machines of turbojet engine. The choice of optimal parameters of SAC is made by means of cash-empirical models, which are based on the decision problem of the waveguide in the case of sound distribution in a nonuniform channel with a smooth change of parameters in its length and for the case of the potential flow.

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