

Simulation of complex radiation action on aircraft constructions

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Due to the intensive development of generators of radiation and particles having various physical nature, it is required to design flying vehicles (FV) operating under the conditions of high-intensity energy fluxes [1]. The main method of confirming the strength to thermal and mechanical actions of radiation and particle fluxes is testing of full-scale aircraft structures to non-stationary loads from devices modeling these actions.

The work proposes new explosive devices and a unified test stand, which allows to model low-pulse mechanical action together with the thermal action. Thermal action is reproduced by contact electric heaters, high-power EHF emitters and pyrotechnic sheet charges.

A distinctive feature and advantage of the stand is the possibility to control the parameters of thermal and mechanical actions during the test. Such control is essential, since the reproducibility of these parameters when using explosive and pyrotechnic devices in some cases is insufficient. In particular, control is provided by the use of the ballistic pendulum technique to measure the momentum of the force transmitted to the tested construction. The design of the unified test stand takes into account previous developments [2], but a principal change has been made. Previously, heater and explosive device were exchanged by rectilinear movement. In the new version, the rotation of tested construction between heater and explosive device is proposed to use.

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- [1] Bakulin V and Ostrik A 2015 *Complex action of radiations and particles on the thin-walled constructions having heterogeneous coverings* (M: FML)
- [2] Ostrik A, Romadinova E, Cheprunov A and et al 2008 *Mechanical X-ray action on thin-walled composite constructions* (M: FML)