Universal bench for testing aircraft constructions on complex action of radiations and solids impacts

Cheprunov A A[1,@], Ostrik A V[2] and Nikolaev D N[2]

[1] 12 Central Scientific Research Institute of the Ministry of Defense of the Russian Federation, Sergiev Posad, Moscow Region 141307, Russia
[2] Institute of Problems of Chemical Physics of the Russian Academy of Sciences, Academician Semenov Avenue 1, Chernogolovka, Moscow Region 142432, Russia

[@] alexander.cheprunov@yandex.ru

Modern aerial vehicles (AV) can be affected by radiation fluxes and impact of solids. The strength of the AV construction is provided to the action of each factor separately. As a rule, consideration of the complex of thermal and mechanical actions of these factors is not carried out when designing AV constructions. However, the thermal action of radiation reduces the strength of the constructions to mechanical action, and the mechanical action, damaging the heat protective layers, reduces the resistance to thermal action [1].
Numerical confirmation of the strength of constructions to complex action is unreliable and not provided by constants of materials. The main method is strength testing of constructions by non-sttionary loading with devices simulating thermal and mechanical actions [2] New explosive devices and a universal stand [3], which allow you to simulate the low-pulse mechanical effect of radiation and impact together with the thermal action of radiation, are offered. Thermal action is reproduced by contact current-conducting plates, high-power EHF emitters and sheet pyrotechnic charges. An pneumatic gun is used to accelerate the striker.

[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)
[3] Cheprunov A, Ostrik A and Kuzmenko A 2022 Patent application 2022112877/28 (026755): Test bench for testing of aircraft constructions for combined action of thermal and mechanical loads