SET OF DEVICES FOR SIMULATION OF COMPLEX ACTION OF RADIATIONS AND PARTICLES FLUXES

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Forecasting of consequences of thermal and mechanical actions of radiations and particles fluxes (RPF) for composite constructions represents considerable interest [1, 2]. Usually thermal action accompanies mechanical action. Constructions accumulate heat at repeated RPF influences. Such accumulation can reduce construction strength durability to mechanical action. Thus researches of complex RPF action realized on a construction is almost important [3].

Carrying out experimental studies for direct and repeated RFP influence localized on large-scale construction is impossible or expensive in many cases. As rule settlement and experimental approach [2] is used. Realization of this approach demands creation of devices set for simultaneous modeling of thermal and mechanical RPF actions.

In present work the devices set is offered for reproduction of complex RPF. These devices reproduce heatings (to one thousand degrees) and impulses of pressure (0.01-1kPa×s) having duration (0.05-300µs). Various ways of generation of non-stationary thermal and mechanical loadings are used. Mechanical loadings are generated by an explosive detonation or electric explosion of a metal foil or a throwing of plates. Thermal fluxes are generated by the laser radiation or highest frequency radiation or heating elements or a stream of high-temperature gases.

Results of research of pulse loads action realized on composite three-layer samples are represented. Two external layers carry out protective functions (in particular it is the damping and heat-insulating functions. The third protected layer is carrier part of a studied design. The uneven temperature profile is done in these samples before reproduction of mechanical action. The received results allow us to draw important conclusions about efficiency of various variants of constructional protection designed from complex RPF action.