Energy-absorbing characteristics of the re-entry vehicle landing gear crash box

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The article defines energy-absorbing characteristics of the thin-walled energy absorber (crash box) mounted on the advanced landing gear of the aerospace system's re-entry spacecraft. We consider verifying the parameters of the shell-type finite-element model of small dimension in the software package MSC Nastran SOL700. The work simulates a model problem of elasto-plastic crumpling of square aluminum samples of different thickness. We compare the simulation results with the experimental data. It has been established that the suggested mathematical model provides the tolerance of less than 10 percent for the samples having a width-to-thickness ratio C/s > 30. Based on the model's verified parameters we have obtained the main energy-absorbing characteristics of the basic square crash box of the landing gear, which was subjected to geometrical modifications in order to improve its damping capabilities. The results obtained can be used for studying the characteristics of the advanced landing gear containing energy-absorbing elements.

Keywords: *crash box, energy absorption, MSC Nastran SOL700, landing gear, computational simulation*

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