Identifiant de la contribution : **261** Type : **non spécifié**

”SYSID#6 - Design of a Resonant Plate for Pyroshock Testing based on Shape and Size Heuristic Optimization”

mardi 11 juillet 2023 12:20 (20)

Resonant plate testing is a common laboratory test method for qualifying space equipment which needs to withstand strong high-frequency shocks, usually activated by pyrotechnic devices and transmitted to the structure. Given their impulsive nature, shocks could critically damage onboard equipment and jeopardize the success of the mission. NASA-STD-7003A international standards are usually adopted to establish the requirements, in terms of a Shock Response Spectrum (SRS), for the qualification of space equipment according to the launch vehicle characteristics. To foster repeatability and safety in laboratories, the most common test facilities exploit the launch of an impacting object (e.g., hammers, dropping masses, pistons, or bullets) on a resonant plate on which the component under test is mounted. In this work, a numerical model able to completely simulate a pyroshock test is used to perform a shape and size heuristic optimization of a resonant plate to match the required SRS. Limiting the energy inputs, the performances of regular polygonal rather than irregular quadrilateral shapes and sizes are investigated and compared. The algorithm features an embedded Computer-Aided Design (CAD) modeler, a Finite Element (FE) solver, and a Genetic Algorithm (GA) optimizer, ensuring accuracy and flexibility in predicting the behavior of a resonant plate with a complex shape. The optimized design of a resonant plate permits improvements in both the SRS accuracy and the time and cost efficiency of its tuning.

Presenter(s) : VIALE LUCA

Classification par session : Survishno 1 / Model & System identification