Abstract Template

Abstract Title: Modeling and experimental verification of the new smart material Vacuum Packed Particles

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Abstract (not more than 300 words)

In this work the material parameter identification, simulations and experimental verification of the new smart material Vacuum Packed Particles is presented. The considered material is a structure composed of granular material inside the plastomer coating. When the pressure inside is equal or higher than atmospheric the system behaves like a liquid, otherwise like an elasto-plastic solid with a temperature and strain rate dependence. By changing the underpressure inside the coating it is possible to control the mechanical properties of the structure in a real time. In this work the approach to model parameter estimation is presented. Additionally, the proposed model is implemented into LS-DYNA code Finite Element Method. In order to verify the simulation results a corresponding experimental tests were conducted using optical strain measurement system. The comparison of the outcomes showed a good correlation. At the end of the paper some new engineering application using this material will be presented.

Keywords—Smart material, Vacuum Packed Particles, Numerical Modelling, Model identification

Professional Biography (100-150 words)

Piotr Bartkowski has completed his PhD at the age of 28 years from Warsaw University of Technology. He works at Faculty of Automotive and Construction Machinery Engineering as a scientist.

