

Advanced Energy Absorbers Used in Blast Resistant Systems

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Abstract : The main aim of the presented experiments is to improve behaviour of sandwich structures under dynamic loading, such as crash or explosion. This paper describes experimental investigation on the response of new advanced materials to low and high velocity load. Blast wave energy absorbers were designed using two types of porous lightweight raw particle materials based on expanded glass and ceramics with dimensions of 0.5-1 mm, combined with polymeric binder. The effect of binder amount on the static and dynamic properties of designed materials was observed. Prism shaped specimens were prepared and loaded to obtain physico-mechanical parameters - bulk density, compressive and flexural strength under quasistatic load, the dynamic response was determined using Split Hopkinson Pressure bar apparatus. Numerical investigation of the material behaviour in sandwich structure was performed using implicit/explicit solver LS-Dyna. As the last step, the developed material was used as the interlayer of blast resistant litter bin, and it's functionality was verified by real field blast tests.

Keywords : blast energy absorber, SHPB, expanded glass, expanded ceramics

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