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Numerical modelling of closed-cell aluminium foam under dynamic loading PAUL HAZELL, M.A. KADER, M.A. ISLAM, J.P. ESCOBEDO, School of Engineering and Information Technology, UNSW Canberra, M. SAADATFAR, Department of Applied Mathematics, Australian National University —
Closed-cell aluminium foams are extensively used in aerospace and automobile industries. The understanding of their behaviour under impact loading conditions is extremely important since impact problems are directly related to design of these engineering structures. This research investigates the response of a closed-cell aluminium foam (CYMAT) subjected to dynamic loading using the finite element software ABAQUS/explicit. The aim of this research is to numerically investigate the material and structural properties of closed-cell aluminium foam under impact loading conditions with interest in shock propagation and its effects on cell wall deformation. A μ -CT based 3D foam geometry is developed to simulate the local cell collapse behaviours. A number of numerical techniques are applied for modelling the crush behaviour of aluminium foam to obtain the more accurate results. The simulation results are compared with experimental data. Comparison of the results shows a good correlation between the experimental results and numerical predictions.

Paul Hazell
School of Engineering and Information Technology, UNSW Canberra

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