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Modeling large deformation and failure of expanded polystyrene crushable foam using LS-DYNA (Article)

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Abstract

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In the initial phase of the research work, quasistatic compression tests were conducted on the expanded polystyrene (EPS) crushable foam for material characterisation at low strain rates (8.3×10^{-3} to $8.3 \times 10^{-2} \text{ s}^{-1}$) to obtain the stress strain curves. The resulting stress strain curves are compared well with the ones found in the literature. Numerical analysis of compression tests was carried out to validate them against experimental results. Additionally gravity-driven drop tests were carried out using a long rod projectile with semispherical end that penetrated into the EPS foam block. Long rod projectile drop tests were simulated in LS-DYNA by using suggested parameter enhancements that were able to compute the material damage and failure response precisely. The material parameters adjustment for successful modelling has been reported. © 2014 Qasim H. Shah and A. Topa.

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