Dynamic compressive behaviour of sandwich panel with shear thickening fluid filled pyramidal lattice truss core

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Highlights

- The “1+1>>2” dynamic energy absorption behavior of sandwich panel with shear thickening fluid filled pyramidal lattice truss core is obtained.
- The non-symmetrical buckling to symmetrical buckling transition of core beams is observed after filled with STF.
- A hydrodynamic constitutive model for the STF is developed based on experimental results.
- An analytical compressive model is developed to modeling the dynamic compressive resistance of the STF.
- The coupling effect between the plastic buckling of core beams and the shear thinning and shear thickening behavior of the STF is analyzed by fluid-structure interaction (FSI) numerical simulation.
- A promising method is provided for the design of sandwich panels over a wide range of impulses for dynamic energy absorption by filling STF with various shear thinning and shear thickening behavior.

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