

# Blast resistant performance of cladding with folded open-top truncated pyramid structures as core

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## Abstract

Two open-top truncated pyramid structures with base shape of triangle and pentagon are developed based on the previously studied truncated square pyramid structure. The sidewalls of proposed structures are interconnected via triangular interconnections which provide extra constraints and inertia stabilization effect during the crushing. Good crushing behaviours are demonstrated with high average stress, uniform collapsing and strain rate insensitivity. They show potential applications as energy absorbers, e.g., sacrificial cladding to mitigate blast loading. Geometric parameters of these structures are determined by top, bottom edge length and height of unit cell. The numerical model is firstly calibrated, and then their blast mitigation capacities are examined as sacrificial cladding core. Their performances are evaluated by comparing the peak force transmitted to the protected structure subjected to various blast intensities. Significant reduction in transmitted load to the protected structure has been observed for the structure with the proposed cladding protection under blast loading.



**Figure 1:** (a) truncated triangular pyramid folded core for cladding; (b) assembling method for quick onsite deployment; (c) single unit cell of truncated pentagonal pyramid folded structure