

The Effect of the Hexagonal Ring Interior Angle on Energy Absorption Capability

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Abstract : In this paper, the effect of changing the interior angle of a hexagonal passive energy absorber is investigated. Aluminum hexagonal structures have been tested under in-plane quasi-static compression tests. These hexagonal structures are designed to have varying interior angle values to study their crushing behavior and the relationship between the angle and the energy absorption capability. It was found that the structures with angles 40° and 45° showed an almost perfectly stable crushing mechanism with low initial peak force. Thus, hexagonal structures with these angles can be used in the vehicle's crumple zones to absorb energy during collisions. The larger angles required high initial peak force to start crushing, which indicates that these structures are best suited in applications where high load carrying capacity is needed.

Keywords : energy absorption, crushing force efficiency, crushing mechanism, hexagonal angle, peak force

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