

Impact response of thin-walled tubes: A prospective review

Abstract

Thin-walled structures have been widely used in various structural applications as impact energy absorbing devices. During an impact situation, thin-walled tubes demonstrate excellent capability in absorbing greater energy through plastic deformation. In this paper, a review of thin-walled tubes as collapsible energy absorbers is presented. As a mean of improving the impact energy absorption of thin-walled tubes, the influence of geometrical parameters such as length, diameter and wall thickness on the response of thin-walled tubes under compression axial loading are briefly discussed. Several design improvements proposed by previous researchers are also presented. The scope of this review is mainly focus on axial deformation under quasi-static and dynamic compressive loading. Other deformations, such as lateral indentation, inversion and splitting are considered beyond the scope of this paper. This review is intended to assist the future development of thin-walled tubes as efficient energy absorbing elements.