

Plastic collapse and energy absorption of empty circular aluminum tube under transverse quasi-static loading

ABSTRACT

This paper presents an experimental investigation on plastic collapse and energy absorption of empty circular aluminum tubes under quasi-static transverse loading. Tubular structures being a critical demand as material saving, high energy absorption and good strength characteristics were of major concerns due to its wall thinness, and so, its various diameter-to-thickness (D/t) ratios and span lengths. Studies found that empty circular Al-tube structure subjected to transverse standard three-point bending loading undergone three plastic deformation phases, starting with crumpling phase, crumpling and buckling phase, and lastly the structural collapse. The results found that energy absorption of empty aluminum tubes for a constant D/t ratio decreases as span length. On the contrary, the energy absorption of empty aluminum tubes for a given constant span length increases with the increase in D/t ratio.