

Experimental Investigation of Folding of Rubber-Filled Circular Tubes on Energy Absorption Capacity

Authors : MohammadSadegh SaeediFakher, Jafar Rouzegar, Hassan Assaee

Abstract : In this research, mechanical behavior and energy absorption capacity of empty and rubber-filled brazen circular tubes under quasi-static axial loading are investigated, experimentally. The brazen tubes were cut out of commercially available brazen circular tubes with the same length and diameter. Some of the specimens were filled with rubbers with three different shores and also, an empty tube was prepared. The specimens were axially compressed between two rigid plates in a quasi-static process using a Zwick testing machine. Load-displacement diagrams and energy absorption of the tested tubes were extracted from experimental data. The results show that filling the brazen tubes with rubber causes those to absorb more energy and the energy absorption of specimens are increased by increasing the shore of rubbers. In comparison to the empty tube, the first fold for the rubber-filled tubes occurs at lower load and it can be concluded that the rubber-filled tubes are better energy absorbers than the empty tubes. Also, in contrast with the empty tubes, the tubes that were filled with lower rubber shore deform asymmetrically.

Keywords : axial compression, quasi-static loading, folding, energy absorbers, rubber-filled tubes

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