

Effects of Position and Cut-Out Lengths on the Axial Crushing Behavior of Aluminum Tubes: Experimental and Simulation

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Abstract : Axial compression tests are performed on circular tubes made of Aluminum EN AW 6060 (AlMgSi0.5 alloy) in T66 state. All the received tubes have the uniform outer diameter of 40mm and thickness of 1.5mm. Two different lengths 100mm and 200mm are used in the analysis. After performing compression tests on the uniform tube, important crashworthy parameters like peak force, average force, crush efficiency and energy absorption are measured. The present paper has given importance to increase the percentage of crush efficiency without decreasing the value energy absorption of a tube, so a circumferential notch was introduced on the top section of the tube. The effects of position and cut-out lengths of a circumferential notch on the crush efficiency are well explained with relative deformation modes and force-displacement curves. The numerical simulations were carried on the software tool ANSYS/LS-DYNA. It is seen that the numerical results are reasonably good in agreement with the experimental results.

Keywords : crash box, Notch triggering, energy absorption, FEM simulation

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