EXPERIMENTAL CHARACTERIZATION OF ALUMINUM FOAMS UNDER DYNAMIC COMPRESSIVE LOADING BY MEANS OF ENERGY-ABSORPTION AND EFFICIENCY DIAGRAMS

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Abstract

This work presents a mechanical characterization of different AlMg0.6Si0.3 aluminum foams under dynamic compressive loading using energy-absorption and efficiency diagrams. The experimental tests were carried out on half-cylindrical specimens having densities in range of 460 – 960 kg/m³ at room temperature with a loading rate of 3.7 m/s. Experimental results show that the main mechanical properties increases with increasing of density which means that density plays an important role for these types of cellular materials. The lowest foam density „1“ before to absorb the amount of energy W generates a high peak stress (σp)1. The highest foam density „3“ also generates a high peak stress (σp)3 before absorb the amount of energy W. It has been found that between the two extremes is the optimal density „2“ which absorbs the same energy W, generating a lower value of peak stress (σp)2. On the other hand the most of the energy is absorbed in the plateau region because of the cell deformation and the authors have found that both energy-absorption diagrams and efficiency diagrams shows the same result which means that the two methods are consistent.

Keywords: Aluminium foams, energy absorption, efficiency diagrams, dynamic tests, density

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