

THE ROLE OF CORRUGATION DIE PARAMETERS ON THE MECHANICAL PROPERTIES OF ALUMINIUM ALLOY (AA 5083) PROCESSED BY REPETITIVE CORRUGATION AND STRAIGHTENING

SHANMUGAVEL Balasivanandha Prabu, Thangapandian N.

Anna University, Chennai, India

Abstract

The microstructure and mechanical properties of Aluminium alloy (AA 5083) processed through Repetitive Corrugation and Straightening (RCS) are studied. The RCS process consists of corrugating a flat specimen with a pair of systematically grooved dies and straightening was done with two parallel flat dies. The aluminium samples were subjected RCS process using two different die sets namely truncated V groove dies (Die 1) whose breadth=height=5mm and $\theta=30^\circ$ and another set of dies with circular profile with radius=10 mm (Die 2) both having different die parameter. The specimens were subjected to maximum 8 passes. The grain refinement is studied from the microstructure examination using EBSD and TEM. The mechanical properties such as Tensile strength, Hardness and the grain size were compared. The Tensile strength and Hardness found to be increasing with respect to the number of passes. The tensile strength increased up to 25% in the sixth pass when compared to the parent material. But the strength and hardness values were reduced at 8th pass due to the surface cracks. The EBSD analysis showed the significant grain refinement in the alloy. The studies showed that the Die - I is superior to Die - II for grain refinement.

Keywords: Repetitive corrugation and straightening, strain rate, Tensile strength, Hardness, Grain refinement

Author did not supply full text of the paper/poster.