

## ABSTRACT

Porosity is very important parameter to evaluate the quality of butt-joint since it is recognized to be one of the major concerns during welding of aluminium alloys. The filler metal used during welding process is believed to play a role on porosity formation in aluminum alloy welds. The present investigation is aimed to study the effect of different filler (ER4043 Al-5%Mg and ER5356 Al-5%Si) on porosity formation of AA6061 aluminium alloy joints by using Gas Metal Arc Welding (GMAW). Butt-joint welds were made on 6 mm thick plates using 21 – 22 V arc voltage. The mechanical properties of aluminium alloy weld were characterized using tensile test and bending test. The porosity formation in weld zone was extensively studied, with the use of different experimental method (X-Ray radiography + image analysis, tomography), in order to obtain images of porosity. The highest porosity content was found densely using ER5356 filler weld with the percentage area value of 7.3 %, while ER4043 filler gave the percentage area value of 6.5%. The highly dense of porosity in ER5356 filler weld metal produced lower mechanical properties compared to ER4043 filler weld metal which contain less porosity. It is believed that Si and Mg contains of which are major elements in both fillers play important role in formation of porosity.

**Keywords:** Aluminium alloy AA6061, hardness, porosity, filler metal, gas metal arc welding