Call for Papers for Special Issue on “Solid Bonding Phenomena and Joining Technologies”

One of the main issues related to fusion welding process is the mechanical properties of the joints, as melting and solidification of the base material results in a change in the microstructure of the metal, with detrimental effects on the joint performances. It is known that maintaining the metal to the melting temperature causes grain growth, and, consequently, an increase of the grain boundaries, which represents an energetic barrier. Additional issues include the presence of inclusions and porosities as well as large distortion and residual stress in the welded joint.

Using solid state welding techniques, most of these issues are overcome or minimized, as material processing occurs at about 80% of the parent material melting temperature. Proper values of contact pressure and temperature must be reached and maintained for an adequate time in order to obtain good joint integrity. Usually, during the process the material undergoes large strain, thus inducing the onset of recrystallization phenomena further enhancing the mechanical properties of the processed parts. Small grain size and reduced heat input are the cause for the high mechanical resistance and low distortion and residual stress observed in solid bonded joints.

Solid bonding occurs in several different manufacturing processes other than welding as Porthole Die Extrusion and Roll Bonding.

Guest Editor: Prof. Livan Fratini
Manufacturing Technology Group, University of Palermo
Vice-President of the Board of AITEM (Italian Association of Manufacturing)
Fellow of CIRP (The International Academy for Production Engineering)