Abstract
Properties of cast aluminum components can be improved by strategically placing ferrous inserts to locally improve properties such as wear resistance and stiffness. A cost-effective production method is to cast-in the insert using the solidification of the molten aluminum as a joining method. Metallurgically bonding between the metals could potentially improve both load and heat transfer across the interface. The metallurgical bond between the steel and the aluminum has to be strong enough to withstand stresses related to solidification, residual stresses, thermal expansion stresses, and all other stresses coupled with the use of the component. Formation of a continuous defect free bond is inhibited by the wetting behavior of aluminum and is governed by a diffusion process which requires both energy and time. Due to the diffusional nature of the bond growth in combination with post manufacturing heat treatments defects such as Kirkendall voids can form. The effect of aluminum alloying elements during liquid-solid bond formation in regards to microstructural changes and growth kinetics has been described. A timeframe for defect formation during heat treatments as well as microstructural changes has been established. The effect of low melting point coatings (zinc and tin) on the nucleation of the metallurgical bond has been studied as well the use of a titanium coating for microstructural modification. A set of guidelines for successful metallurgical bonding during multi-material metal casting has also been constructed.
Compound casting is an attractive approach to create multi-material components and thus reduce the overall weight, while maintaining both the functional and mechanical properties. In this work, Al7SiMg alloy/copper compound castings were produced by a low-pressure die casting process. A flux coating was applied on copper pipes to reduce the oxide layer present in the interface between Al and Cu. Advanced GMAW processes have significant potential in the fusion welding of dissimilar non-ferrous metals of different grades. Accurate control of the heat input allows more effective prediction of the intermetallic properties and better control of post-heat treatments. A wide variety of ferrous metal casting options are available to you, such as condition, applicable industries. Because the vitrified bond has no elasticity, it is better suited for tight tolerance applications than resin bond wheels. Factory direct sintered diamond grinding wheel D150 edging wheel 19MM. 305 ferrous metal casting products are offered for sale by suppliers on Alibaba.com, of which other metals & metal products accounts for 3%. A wide variety of ferrous metal casting options are available to you, such as new.