

## **Abstract**

The high-aluminium zinc (ZA) alloys have been developed as competitive alternative materials to most aluminium casting alloys, bearing bronze, cast iron, as well as to plastics and steel fabrications. The present study involves the modification of a zinc-aluminium alloy (ZA27) by nickel, a high melting element, and the commercial master alloys, Al-5Ti-1B and Al-5Sr. The evolution of as-cast microstructure and the effect of heat treatment on the phases and hardness have been presented in detail with the aid of binary and ternary phase diagrams. The effects of the modified dendritic structure and the Ni-based intermetallic phases on the abrasive and dry sliding wear behavior have been studied. Significant improvement in tribological behavior has been observed for alloys modified with master alloys as well as with Ni. Effects of the modification on other properties like corrosion, damping and aging behavior have also been studied. Zn-22Al alloy was one of the earliest alloys to have been studied for superplasticity. The present study also involves an investigation of the effect of Ni-based intermetallic phases on the room temperature tensile properties of this superplastic alloy. It has been observed that Ni improves the room temperature tensile strength of Zn-22Al alloy at the cost of ductility.