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The Effects of T5 and T6 Heat Treatments on Wear Behaviour of AA6063 Alloy

Abstract: In this study, T5 heat treatment was applied to AA6063 alloy aged at 455 K for 2 hours after extrusion at 686 K. T6 heat treatment was also carried out by ageing at 455 K for 2 hours after solution heat treatment at 794 K for 1 hour. Heat treated T5 and T6 specimens were tested by pin-on-disc type wear equipment. Wear test was carried out by using 10, 20, 30 N loads and 400, 800, 1200 and 1600 m wear distance. T5 and T6 heat treated specimens were characterized with scanning electron microscope, X-ray diffraction (XRD), energy dispersive spectroscopy (EDS) and hardness measurements. Worn surfaces of the specimens was also characterised with SEM. The results indicated that small and homogenously dispersed Mg_2Si precipitates formed in AA6063 aluminium alloy with T6 heat treatment were compared to the T5 heat treatment. As a result of increment precipitate size, wear resistance decreased. T6 heat treated specimens showed higher hardness compared to the T5 heat treated specimens. In addition wear resistance and friction coefficient of both T5 and T6 heat treated specimens decreased with increasing applied load.

Keywords: AA6063 alloy, T5 and T6 heat treatment, wear behaviour