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Mechanical and Tribological Characterization of Squeeze Cast Al 6061 Alloy Reinforced with SiC and Al_2O_3 Particulates

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Abstract : Due to economic and environmental requirements, it is becoming increasingly important to reduce vehicle weight. The first approach consisted in using light materials with high thermal conductivity, such as aluminium alloys. This choice allowed significant mass reduction and lower temperature but required recourse to ventilated discs. Among aluminium alloys, Al 6xxx series alloys enjoy the highest strength-to-weight ratio and, therefore, have found wide applications in the automobile and aerospace industries. However, these alloys lose their high strength rapidly when they are exposed to elevated temperatures. This rapid decline in the strength is directly related to the coarsening of very fine precipitates which are then not as effective in obstructing the dislocations. The incorporation of micro-scale and nano-scale particulates in aluminium systems can greatly enhance their mechanical characteristics.

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