

OPTIMIZING THE HARDNESS OF LOCALLY MANUFACTURED 6063 AL ALLOY BILLET BY THE ADDITION OF TITANIUM

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Strengthening mechanisms for Aluminum is a vast and important topic for the industrial Aluminum production. Grain refinement is one such application where finer microstructure is achieved by inoculation with the addition of a foreign element. For Aluminum alloys, elements such as Titanium, Boron and Vanadium are used as grain refiners. This project was conducted to analyze the hardness variation of Al alloy 6063 with the amount of Titanium in the alloy. The added Ti creates intermetallic compounds that act as nucleation inhibitors, making an extra number of nucleation sites in the nucleation and growth stage. The present research involves analyzing the existing 6063 Aluminum alloy billets. Furthermore, 6063 Aluminum alloy samples with inoculated various amounts of Titanium are casted and analyzed in comparison with Al alloy 6063 billet samples taken as reference. The optimized effect of the grain refinement in the Aluminum alloy 6063 with the variation of Titanium content was achieved with a steady increment in hardness and formation of a finer grains in the microstructure.

Keywords: 6063 Al alloy, Titanium