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# Improvement of Abrasive Wear Resistance and Toughness on Hammer Mill Beaters by Additions of Molybdenum and Titanium-Ferroalloys in White Cast Iron

Abstract
The research study will be focusing on the improvement of white cast iron hammer mill beaters that will be manufactured by casting and additions of alloying elements, such as carbide formers, i.e. molybdenum (Mo) and titanium (Ti) into the liquid melt. White cast iron, ASTM A532, Class I, Type A, material designation, NiCrHC alloy. A supplied hammer mill beater (HMB) of white cast iron (WCI) is widely used as crushing component during comminution processing in the gold ore processing. The supplied HMB are approximately lasting less than 336hrs in service. The proposed study will be casting, material characterization and wear testing, respectively. WCI are normally established with cementite (Fe3C), which normally gives wear resistance, while the matrix is responsible for toughness. While, an improvement of wear resistance can be achieved through additions of carbide formers, that will reduce the grain size, establish new carbides, such as molybdenum carbides (Mo2C) and titanium carbides (TiC), plus alloyed Fe3C and alloyed matrix with Mo content of approximately 50% of the melt content. Thus, the aim of the research study is to improve the WCI, HMB wear resistant lifespan by investigating using Brinell hardness tester, emission spectrometer, Vickers's hardness tester, DWART, etc.
Key Words:
White cast iron, hammer mill beaters, titanium and molybdenum, wear resistance

## Apply to be considered for a student ; award (Yes / No)?

yes

## Level for award;(Hons, MSc, PhD, N/A)?

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