UNIVERSITI TEKNOLOGI MARA

EFFECTS OF CARBURIZING HIGH MANGANESE Fe-Mn BASED STEEL ON DEFORMATION PARAMETERS

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ABSTRACT

During the previous five years, there has been a significant increase in research activity dedicated to carburizing of Fe-Mn based steel, driven by the combination of strength and ductility controlled by these alloys. In this research, the effects of carburizing high manganese Fe-Mn based steel on deformation parameters will be investigated. The influence of the carburizing processes on mechanical properties and microstructures of the Fe-24Mn-C high manganese steel were investigated at different carburizing time. This composition was fabricated by casting iron and 24 weight percent (wt. %) of manganese at melting temperature of 1550ºC and then homogenized at 1200°C. After that, the steel samples were carburized for 2, 4, 6, 8 and 10 hours. Tensile test, 3-point bending test and hardness test were used to analyze the relationship between mechanical properties and microstructure after the carburizing process. The results show that excellent mechanical properties were obtained after the carburizing process. The tensile strength of material was decreased, and the ductility of material was improved with increasing carburizing time until 10 hours. This current study summarizes the information that explains why the carburizing process is required, how it affects the deformation load, and how the process was carried out. The findings of this work will benefit the steel industries in which the deformation process can be carried out at lower deformation load.

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