DEVELOPMENT OF DIAGNOSTIC MAPPING OF ASSAB 718HH

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"I declared that this thesis is the result of my own work except the ideas and summaries which I clarified their sources. The thesis has not been accepted for any degree and is not concurrently submitted in candidature of any degree".

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ABSTRACT

Electric Discharge Machining (EDM) provides an effective manufacturing technique that enables the production of parts made of hard materials with processes. The ability to control the process parameters to achieve the required dimensional accuracy and surface finish has placed this machining operation in a prominent position. From that reason, EDM has found broad applications in industry. EDM has resulted great improvements in its technology and become widely used in aerospace, automotive, tool, and die industries. The analysis by other researchers was always focused in examined the work piece after finished the EDM process such as EDM performance without considering the effect of machining to parent metal in term of time. The material that has been used in this study is ASSAB 718HH. It is a premium-quality vacuum-degassed Cr-Ni-Mo-alloyed steel which is supplied in the hardened and tempered condition. Diagnostic mapping is to examine the changing form of the material ASSAB 718HH after EDM based on time. Two types of electrode: Copper (Cu) and Copper Tungsten (Cu-W) were employed since the electrodes give good dimensional accuracy and surface finish according to previous study. Diagnostic mapping is used as a method to identify the changes of machining result after 5, 30, 60 and 90 minutes. Cu and Cu-W are good electrode material since it gives good surface finish. Both electrodes resulted not much different in macro and micro structure observation. From overall results, Cu-W electrode is the best since it offers comparatively low values of surface roughness at high discharge current, giving good surface finish during machining hardened tool steel material, and low diameteral overcut. It also gives less TWR, although the MRR is higher compared to the Cu electrode when machining hardened steel material.

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