

OVERCUT AND PROFILE OF THE MACHINED FEATURES IN ELECTROCHEMICAL MACHINING

BISHNU M JHA¹ & A. MANDAL²

¹Centre for Energy Engineering, Central University of Jharkhand, Ranchi, India

²Department of Manufacturing, Engineering, NIFFT, Hatia, Ranchi, India

ABSTRACT

Electrochemical machining (ECM) can be used to machine complex features in hard and difficult to machine materials with negligible tool wear, reasonable accuracy and acceptable surface finish. The accuracy with which the reverse image of the tool is produced in the work piece is of paramount interest in case of ECM. The basic indices that are considered for evaluating the accuracy are the overcut, corner radius and machined profile. In this study two parameters are considered for evaluating the accuracy of machined feature. They are overcut and profile of the shape produced. The first objective is to develop mathematical models based on Box Behnken design to predict the effect of process variables such as applied potential, inter-electrode gap and feed rate on overcut. However overcut alone, gives very limited information regarding the deviation between the tool shape and feature shape produced in the work-piece. To compare the machined and tool profiles, tool and all the machined profiles obtained from experiments are discretized along the perimeter of image and tool, using AnalysisTM Five Pro. Software Package Then the variation of energy index (%) is computed using higher order harmonics of elliptic fourier descriptors. The variation in energy index is due to minor undulations in the edges of profile.

KEYWORDS: Box Behnken Design, Denoising, Electrochemical Machining, Machined Features, Overcut, SG Iron, Fourier Descriptors, Profile Analysis