

Effects of die shape modifications on the geometrical and dimensional accuracies of cold forged AUV propeller blade.

Abstract

Geometrical and dimensional accuracies are two major concerns in precision forging and they become more critical with increasing part complexity. In this study, the geometrical error of an autonomous underwater vehicle (AUV) propeller blade is quantified by comparing the blade and punch profiles. The nominal geometry of the blade is compared to the blade profile measured using the optical technique Infinite Focus Alicona system to determine profile deviation. The current study aims to investigate the contributions of die shape modifications on the error formation of the two most critical geometries, namely, blade thickness and twist angle. The results show that die modification has a significant effect on geometrical and dimensional errors.

Keyword: Geometrical and dimensional accuracies; Die shape modifications; Cold forging