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Machining Parameters Modeling for Inconel 718 Milling Process

S. Dominguez-Rueda, I. Escamilla-Salazar, B. Gonzalez-Ortiz, and D. Garza-Castaño

Universidad Autónoma de Nuevo León FIME
Universidad s/n, Ciudad Universitaria,
San Nicolás de los Garza, Nuevo León, México

Corresponding author's Email: silveriorueda@outlook.com

Author Note: This article was created to develop an investigation of machining parameters of certain materials in order to obtain correct parameters and provide support for future research.

Abstract: Modeling and simulation of metal cutting processes has the ability to improve the design of cutting tools and select optimum parameters for advanced applications such as high-speed milling (Kuo et al., 2006). This study analyzes the machining parameters for the superalloy, Inconel 718. Pieces of Inconel 718 will be deformed plastically as a consequence of the machining process applied. Machining operations with superalloys can be problematic due to the characteristics of the material. In addition, traditional techniques for machining common alloys are wrongly applied instead of using the correct machining techniques for superalloys.

The present work aims to implement an experimental design in order to obtain relevant information related to the machining efficiency of Inconel 718, and consequential wear on the cutting tool (Fang et al., 2013). In this study a predictive model will be created by analyzing different parameters for machining operation, as well as different diameters of the tools that provide data for process information.

Parameters under study for this research include speed, feed and depth of the cutting process during machining. Analyzed results include the tool wear (Fang et al., 2011), as well as the roughness of the surface of the work piece. Also, other representative variables will be considered that are affected by the machining process.

Registered data and results of the tests will allow for the creation of a statistical regression model and will contribute to improve the machining process of Inconel 718 (Thakur et al., 2009). In addition, a reduction in the wear of the tool during the process will be achieved with consideration to all variables related in the machining process that could affect the final efficiency.

Keywords: Machining Parameters, Statistical Model, Inconel, Milling Process