

# Experimental and Simulation Approach; Investigation Effect of Axial Feed Rate to the Cutting Force in Dimple Milling Using Ball End Mill Tool

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## ABSTRACT:

A recent study indicated that the dimple has potential to improve the parts performance in a way of minimizing friction on a sliding mechanical component. Despite outnumbered dimple fabrication methods, milling process is considered as the versatile process that could produce various dimple profile with complex shape and the process is extremely dependent on the process variable such as machining parameters and cutting tool condition. The present research work aiming to study the effect of the milling machining parameters which is the axial feed rate and tool diameter to the cutting force by means of experimental work and finite element analysis (FEA). The concave dimple profile is machined at different axial feed rate to a flat Al6061 specimen using ball end mill attached to 3-axis CNC milling machine and the cutting force captured by KISTLER force dynamometer and the results will be compared with the FEA results. Based on the results, shows that cutting force increased directly proportional with the increasing plunging feed rates and tool diameters. The investigation work has successfully characterized the influence of studied milling parameters to the cutting forces and the research work will be continued further on the incline milling technique and micro size ball end mill.

## KEYWORDS:

Dimple fabrication; Milling process; Ball nose end mill; Finite element analysis

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