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INVESTIGATING THE USE OF CIRCLE IN GEAR CUTTING AS A SUBSTITUTE TO INVOLUTE PROFILE

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ABSTRACT

Gears are used in various machines and industries for transportation and transmission of power. Other uses are in consumer electronics and many machines used in homes like the washing machines, electric drills and kitchen appliances. Gears come in different sizes ranging from a module of 0.5mm to 100mm.

Currently there is a problem of accurately machining gears. This is due to inaccurate positioning of the blank and cutter. The objective of the study was to investigate and determine an appropriate way of producing quality and accurate gears most economically through the use of a circle as a substitute to involute profile in gear cutting.

Two different gears of same dimensional characteristics were cut; one using a Computer Numerical Control (CNC) machine utilizing circle profile and the other using conventional milling machine. Dimensional comparisons were made on the two cut gears against an actual involute profile to determine the margin of error. The circle involute profile made using CNC was found to be exactly as the true involute profile though an error of 0.09mm in the tooth thickness was observed in lower section of the profile. The milling process was successful though, it was impossible to accurately machine the actual depth and as such, the intended depth of 7.32mm was surpassed by 0.2mm. The tooth was thinner and thicker in the upper and lower parts of the tooth profile respectively. The fillet radii lacked homogeneity.

The involute circle approach was therefore successful and as such can benefit all CNC users and gear cutters in producing accurate gears cheaply.

Keywords: *Gear design, form gear cutters, involute profile, circle profile, CNC machine.*