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Combination Of Fused Deposition modelling with abrasive milling for attaining higher dimensional accuracy and better surface finish (Article)

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Abstract

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Currently, two manufacturing methods, namely CNC (Computer Numerical Control) machining and rapid prototyping (RP), are widely used to produce final products and prototypes. Both the processes have their own advantages. CNC machining such as milling and grinding (subtractive method) can fabricate parts with higher precision and accuracy. On the other hand, RP (additive method), can manufacture parts with complicated 3-D (three dimensional) features, which ensures effective material usage. However, RP produced parts lack accuracy and smooth surface finish. In this research, we are aiming to achieve on-machine mechanical post-processing of 3-D printed (using Fused Deposition Modelling, a kind of RP process) parts to achieve higher dimensional accuracy and better surface roughness. To achieve the goal, we developed a new hybrid system to assimilate both of these processes. There are, however, two vital considerations needed to be taken into account for integrating the two processes. The first concern is the integration of dissimilar control systems for two processes and the second aspect is maintaining the tools' (milling spindle and the heat extruder) setup accuracy during the changeover step. The developed hybrid machine has been tested

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