

A Systematic Approach for Identifying Turning Center Capabilities with Vertical Machining Center in Milling Operation

Authors : Joseph Chen, N. Hundal

Abstract : Conventional machining is a form of subtractive manufacturing, in which a collection of material-working processes utilizing power-driven machine tools are used to remove undesired material to achieve a desired geometry. This paper presents an approach for comparison between turning center and vertical machining center by optimization of cutting parameters at cylindrical workpieces leading to minimum surface roughness by using taguchi methodology. Aluminum alloy was taken to conduct experiments due to its unique high strength-weight ratio that is maintained at elevated temperatures and their exceptional corrosion resistance. During testing, the effects of the cutting parameters on the surface roughness were investigated. Additionally, by using taguchi methodology for each of the cutting parameters (spindle speed, depth of cut, insert diameter, and feed rate) minimum surface roughness for the process of turn-milling was determined according to the cutting parameters. A confirmation experiment demonstrates the effectiveness of taguchi method.

Keywords : surface roughness, Taguchi parameter design, turning center, turn-milling operations, vertical machining center

Conference Title : ICMOIME 2014 : International Conference on Manufacturing, Optimization, Industrial and Material Engineering

Conference Location : Berlin, Germany

Conference Dates : May 22-23, 2014